Trains

JANUARY

25¢

See page 9.

Courtesy The Koppers Company, Pittsburgh.

After the evening rush hour, Long Island Railroad.

Waybills

With our country formally at war we know there will now be complete and helpful unanimity of railfans in obeying whatever restrictions the war department may find it necessary to impose on railroad photography and entrance on railroad property for non-business purposes. There may have been some questioning in the past as to whether restrictions were warranted, but now none of us doubts that ordinary civil rights and courtesies must give way to the orders of our government in order that the enemy be licked as soon as possible.

Railroads must furnish transportation when it is wanted. They cannot manufacture it for inventory, as factories can make goods for inventory, nor can railroads put off orders until a rush period is past. And the demand for transportation does fluctuate. One week in May, 1939, the American railroads carried 554,000 cars of freight, and one week in October, 1939, only five months later, they carried 856,000 cars, a 54 per cent increase. To care for such fluctuations efficiently, without delay and without equipment shortage, the railroads must be in good shape.

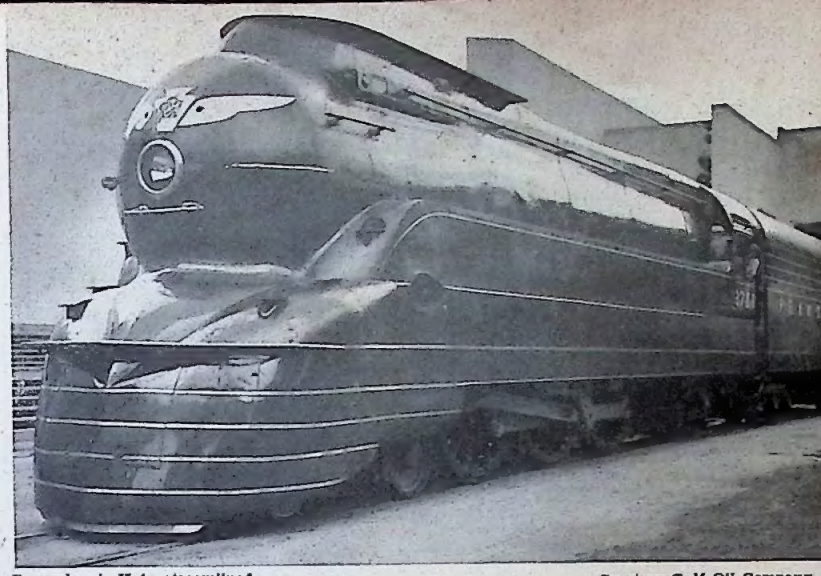
Some of life's minor satisfactions:

Getting a cheerful wave from the engineer of a passing train.

Riding the caboose cupola on a freight-only branch instead of taking the highway bus.

Catching an almost-missed train.

A. C. K.



Pennsylvania K-4s, streamlined. Courtesy Gulf Oil Company.

Trains

Editors: A. C. Kalmbach, Linn H. Westcott, Willard V. Anderson

Vol. 2 January, 1941 No. 3

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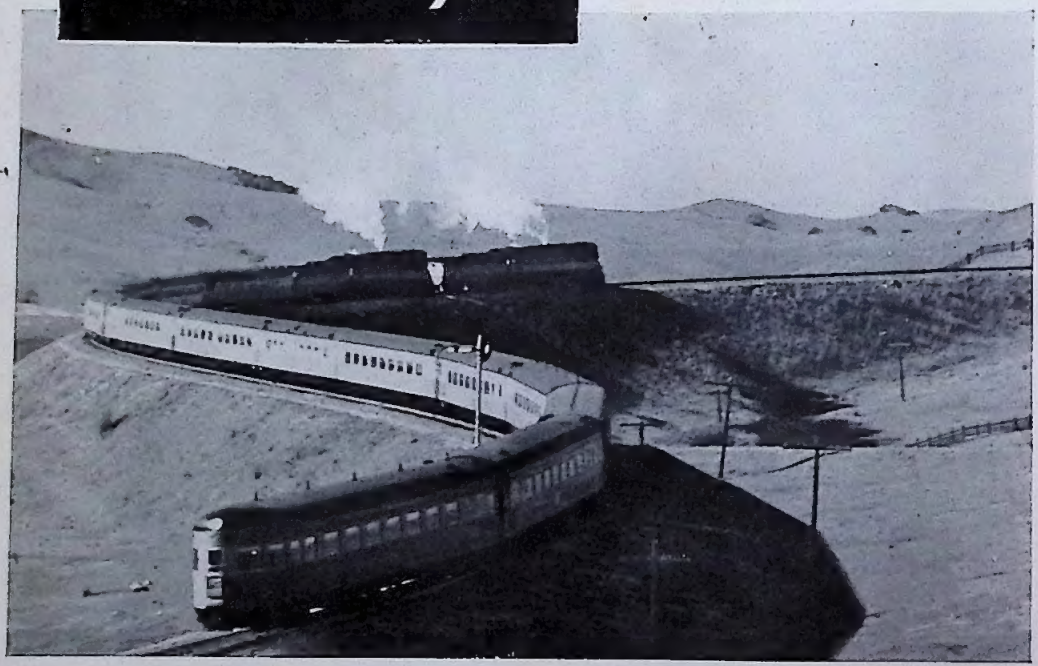
Two Daylights Daily

By J. H. Faler.

★ Southern Pacific's West Coast streamliners carry 1500 passengers a day.



HIGHLY motorized California, with its one passenger automobile for each 2.8 persons, also has the world's best patronized trains, the *Daylights* of the Southern Pacific. San Francisco and Los Angeles, though separated by 470 mountainous miles, are yet but half a state apart, and this shrinking of distances in the huge West means that the business man of one city thinks nothing of running over to the neighboring metropolis for a day. The SP has capitalized on this, and the tourist trade, to the full.

Years ago the crack train up and down the coast was the *Daylight Limited,* about 12 hours running time. A jogging 40 miles per hour average was no mean trick over country that included the Horseshoe Curve at San Luis Obispo (above) and Santa Susanna Pass (page 6), but as of March 21, 1937, everything was streamlined, even the name, and the first *Daylights* emerged.

Twelve cars long, the red and orange Pullman-built trains flashed up and down El Camino Real, the old mission trail, powered by six Lima-built 4-8-4's, Class GS-2, No. 4410 to 4415. Running time was cut to 9 hours 45 minutes, later to the 9½ hours of today. Leaving time at both terminals is 8:15 a. m., allowing a scenic daylight trip.

This speeding up necessitated much track work, heavier rails in some places, and a lessening of the most severe curves, particularly along the 113 miles that skirt the very edge of the Pacific Ocean. Many a high steel trestle

carries the line over arid ravines in the shoreline bluffs, and these trestles were strengthened.

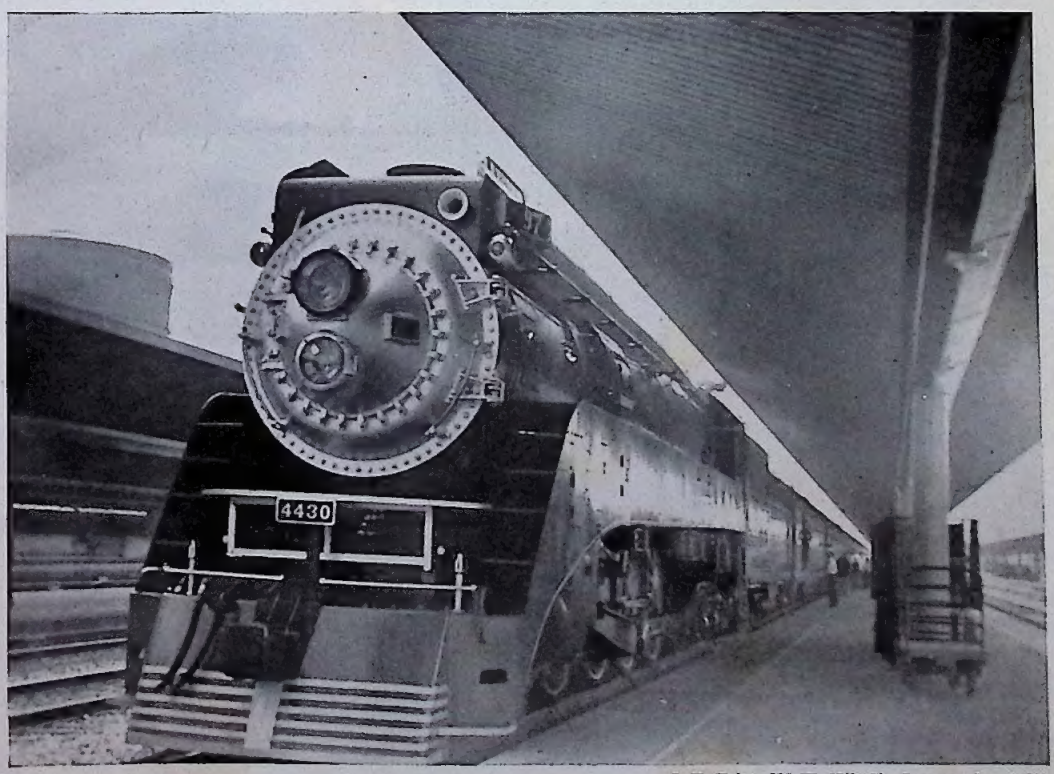
Technicalities, however, didn't interest the public, but color and performance did. The *Daylight* started to pile up impressive passenger records. All coach seats were reserved, and in spite of two additional cars it was soon impossible to get seats except by reserving several days in advance. Extra sections of standard equipment handled the overflow, and even these were at times sold out.

Additional equipment seemed almost inevitable, and in January, 1940, two spanking new 14-car trains replaced the original *Daylights*, and after a shopping the older trains were put on as *Noon Daylights*, leaving each terminal at noon. Now the two trains a day each way handle more than 1500 passengers a day!

Just this last Summer still another *Daylight* entered the fold, the *San Joaquin Daylight*, a pair of trains giving fast day service over the longer Valley line between Los Angeles and San Francisco. This is the general route over which the Santa Fe entered the San Francisco-Los Angeles business three years ago with its combination streamliner-bus service.

The newest of these new trains include such refinements as elevators for loading and unloading hand baggage without delaying passengers in the vestibules, public address systems over which train passenger agents describe scenic features of the route, and three-car dining units with coffee shop on one end, dining room on the other, and kitchen in the middle.

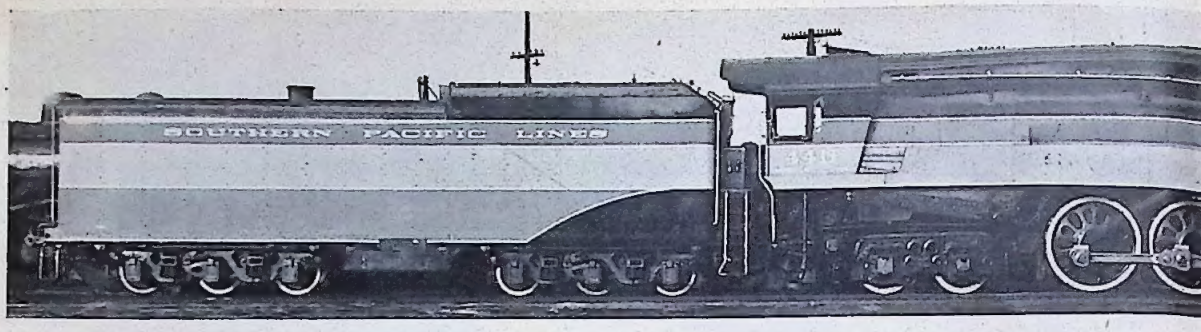
To the original six *Daylight* locomotives 34 have since been added, all much alike in appearance except that the last 20 have two headlights and completely enclosed cabs. Mechanical specifications have been changed for improved performance, putting to good use



J. H. Faler, 626 W. 17th St., Los Angeles, Calif.

Noon Daylight ready to leave Los Angeles.

She will pick up more passengers at 12:18 at suburban Glendale, by 1:30 will be in sight of the ocean, at 2:13 in Santa Barbara, and at 5 o'clock will be rounding the Horseshoe Curve north of San Luis Obispo (see photo opposite page) with a helper for the climb over the summit at Santa Margarita. The 4430 is first of the GS-4's, newest *Daylight* engines. The extra headlight gyrates to warn motorists at grade crossings.

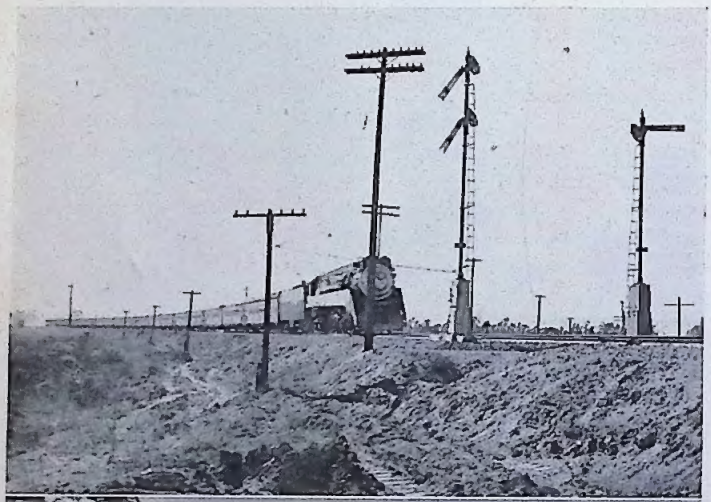


the early experience with the trains, and the *Daylight* class of motive power is now used not only on the streamliners but on night passenger trains and the *Overnight* fast freight.

The *Morning Daylight* continues to be the most popular of the three

Daylights and engines.

At top of page is one of the *Daylight* locomotives. No. 4411 belongs to the earlier Class GS-2 streamlined 4-8-4's, which have been added to by two later classes, locomotives 4423 to 4449, inclusive. These last usually pull the crack streamliners at present. The old *Daylight Limited* was pulled by Mountain type locomotives like No. 4328,

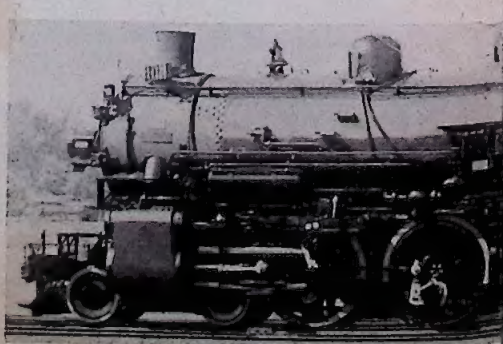


A *Daylight* circle trip.

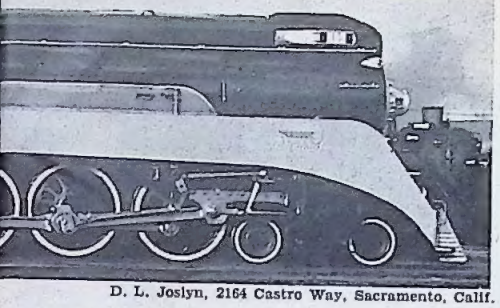
A fine two-day trip is up one Southern Pacific route between Los Angeles and San Francisco and back the other. The *Daylights* make this a comfortable, fast ride. Following the mile posts on the map, let's leave Los Angeles, milepost 483, on the *San Joaquin Daylight*, passing the junction with the Sunset Route to New Orleans almost immediately after we leave the fine new Union Station. Northward we go, to cross the San Gabriel Mountains (including Newhall Tunnel) and enter the Mojave Desert. There follows a long tangent much of the way to Mojave, where the Santa Fe's main line from Chicago to San Francisco joins for joint trackage to Bakersfield.

Beyond Tehachapi Pass, elevation 3793 feet, is Tehachapi, summit of the Tehachapi Mountains. On the descent the train winds around Tehachapi Loop, almost two complete circles making a difference of 77 feet in elevation. This loop was one of the railroad wonders of the world at the time of its construction. The broad San Joaquin Valley is a huge agricultural producer, backbone of Southern Pacific local freight traffic. The valley seems almost endless as the train sings northward, the Sierras dim against the eastern horizon. Fresno is the largest city between San Francisco and Los Angeles; Merced is the junction point for the side trip to Yosemite on the Yosemite Valley Railroad. Just before reaching Martinez, milepost 35, the huge Benecia Bridge can be seen from the right side of the train. This bridge replaced a four-track ferryboat in carrying the SP main lines to Ogden and Portland across the Sacramento River. Last lap is the ferry trip across San Francisco Bay with its incomparable view of the city's skyline.

Southward out of San Francisco on the coast route are a number of tunnels, carrying the line under



Middle photo, F. J. Peterson, 1748 S. New Hampshire Ave., Los Angeles, Calif.; others Southern Pacific.



D. L. Joslyn, 2164 Castro Way, Sacramento, Calif.

daytime streamlined trains, now carrying more than 600 reserved seats. Thus has the King's Highway of New Spain become the scene of a remarkably successful twentieth century modernization of railroad transportation.

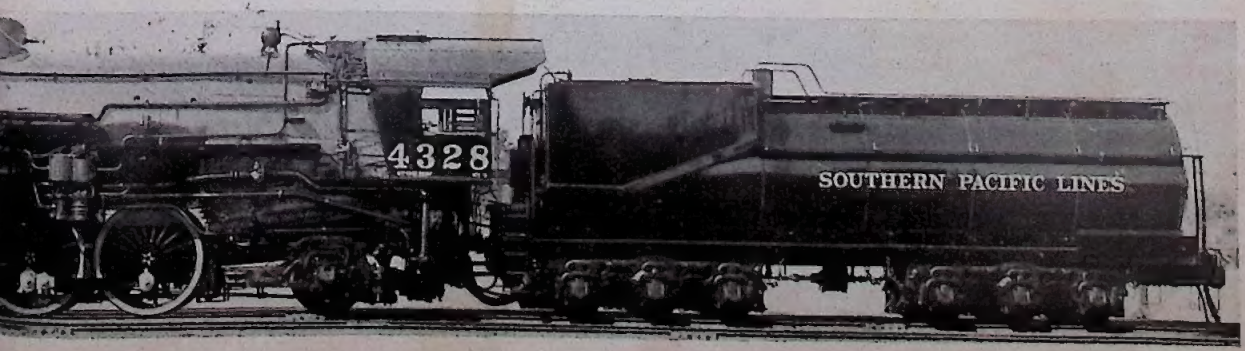
bottom of page. The top train photo could be either a *Coast* or *San Joaquin Daylight* in any of the agricultural areas along the lines. The semaphore signals are characteristic, and notice that they are lower quadrant with a separate arm for distant signal indication. Santa Susanna Pass, middle picture, is one of the chief attractions of the Coast Line, another being the 113 miles of ocean shore right next to the tracks.

bayside bluffs and shortcutting an older line which climbed over the heights some distance back of the bay. Along the southern reaches of the bay are many fine residential suburbs served by SP suburban service. Here is Palo Alto, milepost 30, with Stanford University. South of San Jose, milepost 47, is a fruit orchard belt producing fine apples. Salinas, milepost 114, is near vacation-spot Monterey, once capital of California and at the north end of sunny Salinas Valley, the longest unbroken stretch on the coast route. In a little more than 100 miles the track gradually climbs to an elevation of nearly 1500 feet, and then after a series of tunnels through Santa Margarita Pass quickly drops down around Horseshoe Curve into San Luis Obispo, elevation 243 feet. Here can be seen not only a large SP engine terminal and the changing of *Daylight* locomotives, but equipment of the three-foot gauge Pacific Coast Railway, which the SP crosses some miles farther on.

After milepost 259 the railroad runs almost entirely in sight of the ocean for 113 miles. Take sun glasses for a bright day! As it approaches Point Conception, milepost 321, it is on a narrow ledge between cliffs and sea, and as each deep canyon runs into the coast the line crosses it on a high steel trestle. One of the longest is at Gaviota, milepost 336. Santa Barbara is the showplace of the coast, with one of the most beautiful missions and an interesting Spanish fiesta each year. South of here, oil wells can be seen out in the ocean, and one can also glimpse the Santa Barbara Islands.

After crossing the sugarbeet fields near Oxnard, milepost 404, the railroad climbs across Santa Susanna Pass, through the longest tunnel on the Coast Line, and into San Fernando Valley, where it joins the San Joaquin line at Burbank, just north of Los Angeles.

Linn H. Westcott.



Courtesy Free Public Library, Trenton, N. J.

In Washington's time it was harder. First bridge across the Delaware River was built at Trenton in 1806 for wagons. Then an engineering wonder, it was later reinforced and used as a railroad bridge by the Camden & Amboy, becoming the first interstate railroad bridge in the United States. In 1875 a double-track iron bridge replaced the wood structure. Below is the *Silver Meteor* crossing the present Pennsy bridge at Trenton.

Greatest Show on Earth

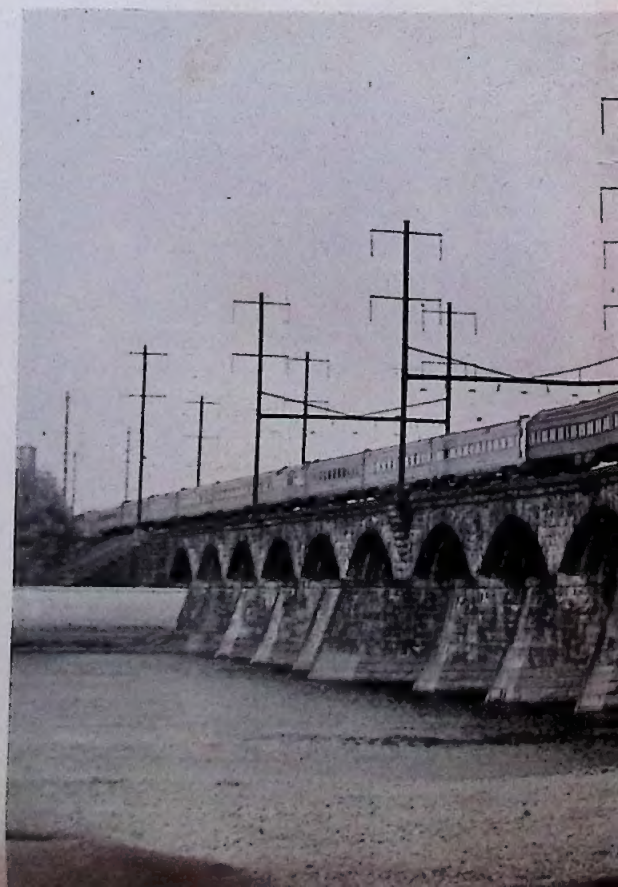
New York Division, P RR.

By W. R. Osborne.

TWICE daily the year around, rain or shine, a stupendous railroad show is presented over the high iron that links the two largest cities on the Atlantic seaboard.

The eastbound *Trail Blazer's* departure from North Philadelphia at 5:51 a. m. heralds a three-hour continuous parade of luxurious trains over the world's busiest stretch of railroad. Blazing a trail through the morning mist that shrouds the countryside between Philadelphia and New York, it leads a fleet of trains converging on America's greatest metropolis from cities as far west as the Mississippi and as far south as the Gulf of Mexico.

In less than three hours, 17 regular eastbound trains leave North Philadelphia. In rapid succession following the *Trail Blazer* go two New York expresses, a Trenton local, the *Clevelander*, the *Cincinnati Limited* and the *Admiral*. At 7:12, 18 minutes back of the *Admiral*, the *Bay State*, a Philadelphia-Boston train, opens the feature of the morning. During the next 16 minutes six eastbound trains leave the station—a train approximately every 2 minutes 40 seconds! These consist of



a "clocker," as the expresses between New York and Philadelphia are locally known, the *Red Arrow* from Detroit, No. 112 from Washington handling cars from the Seaboard's *New York-Florida Limited* and the Chesapeake & Ohio's *F. F. V.*, a New York local, and the all-Pullman *Spirit of St. Louis.*

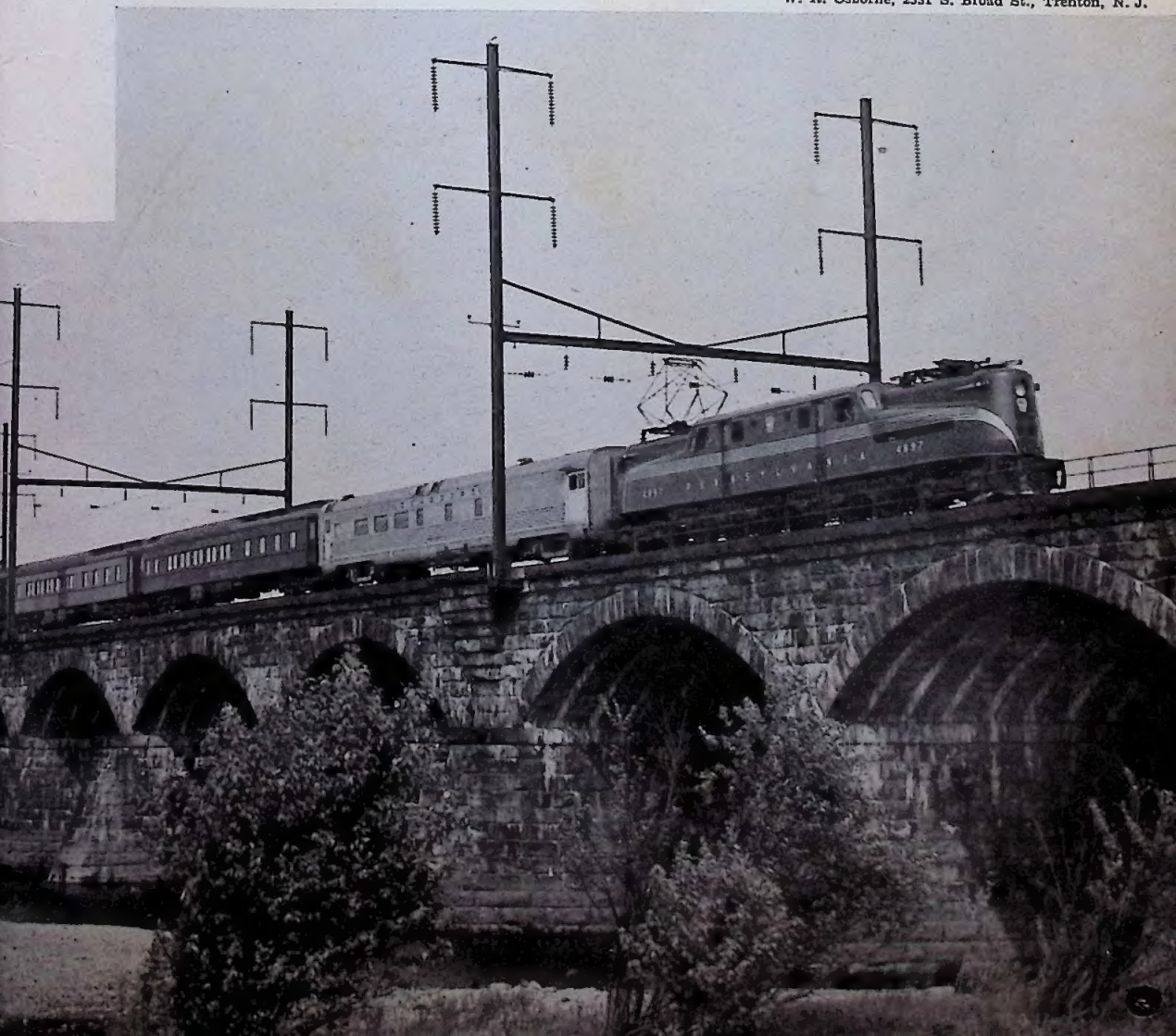
With but a slight slackening the iron is hot for a full hour following the departure of the *Bay State.* In addition to the above-mentioned flyers there is No. 118 from Washington, handling the Southern's *Crescent*; the 17-hour *General* from Chicago; that blue-ribbon veteran, the *Broadway Limited*; the *Pilgrim* for Boston, and the de luxe *Jeffersonian,* a coach train from St. Louis.

Throughout the day tuscan red flyers continue to flash up and down the main

On the cover.

The Pennsy's giant of the World's Fair, the Class S-1 6-4-4-6 steam locomotive, does not parade on the electrified New York Division, but we thought it appropriate for this month's cover anyway, although at present it is not in service. A photographic view is on the back cover. The locomotive at the top of page 3 is one of the earlier streamlined K-4's. The frontispiece scene (page 2) is no doubt familiar to Long Island commuters, but was taken from a different angle. Pennsylvania Railroad owns the Long Island Railroad.

W. R. Osborne, 2331 S. Broad St., Trenton, N. J.



The heavy end of the Pennsylvania Railroad.

These are the tenacles by which the Pennsylvania reaches for its share of the freight and passenger traffic of New York City and vicinity. The Pennsy has America's largest gross operating revenues, and anyone who knows the New Jersey and New York Bay areas realizes the strategic importance of the lines shown on this map in producing the large revenues. The dates along the various stretches of track show the years of construction and make clear the way the New York Division developed. The southern of the two parallel main lines is the old Camden & Amboy, earliest portion of the Pennsy system and one of the country's first railroads. The northern of the parallel lines is the present main line of the division, the main line on which traffic is ceaseless with a day-'round average of a train every five minutes or less. The cross-hatching indicates electrified trackage, and, incidentally, the most used trackage. Notice the major improvement project of 1864, the relocation of the main line between Trenton and Monmouth Junction.

Linn H. Westcott.

line of the Pennsylvania Railroad's New York Division. Mingling with these is an occasional stainless steel streamliner, a multitude of darting locals, and mile-long rumbling freights.

At 4:29 p. m. the conductor of the westbound *Senator* "keys out" to the train director in A tower, signaling the opening of the day's second spectacular performance. One minute later the *Senator*, hauled by a mammoth GG-1 electric engine, glides out of the Pennsylvania Station, New York. Slipping away from the platform nearly 50 feet below street level as quietly as an ocean greyhound leaves its berth, the marker lamps fade from sight into the 2½-mile tunnel that bores beneath the Hudson River and seem to beckon the great fleet of express trains poised at Sunnyside Yard on Long Island to follow them westward.

Again it is high tide on the broad way. Following the *Senator* by a minute is the Lehigh Valley streamliner *John Wilkes*. Then comes the *Southerner*, an all-coach stainless steel streamliner for New Orleans, the most distant city served directly by a New York Division train. Trailing the sleek highliner by eight minutes is the *Shopper*, a seashore-bound express. At 5 o'clock the *Broadway Limited* slips westward. During the next 60 minutes at least 11 westbound trains leave Penn Terminal. They are the *Red Arrow*, the *Cincinnati Limited*, the *Trail Blazer*, the *Embassy*, the *Spirit of St. Louis*, the *Jeffersonian*, two "clockers" and three locals for New Brunswick, South Amboy and Trenton respectively.

On they roll into the golden glow of a New Jersey sunset. From 6 to 7 there is the *Arlington* for Washington with Seaboard, C&O, and Southern connections; the *Manhattan Limited* for Chicago; a Philadelphia local; a local for Trenton. These are closely-followed by the *Patriot*, off the New Haven from Boston for Washington, a Philadelphia express and the Lehigh Valley's *Maple Leaf* for Buffalo.

And so around the clock trains come and go on this bustling iron trail, to and from cities scattered far and wide over the country. In 24 hours more than 120 regular trains arrive, and an equal number depart from the New York station. This is a train each way on an average of about every 12 minutes. But there are many more. Some days will see upwards of 40 or 50 extras and specials, a possible total of about 290 trains not including freights. Every day from 50 to 60 of these move over the main line west of Newark. Nor does it include the Long Island trains which also use the New York Station. Many trains of this road arrive and depart daily, and while they do not operate west of the station they do increase considerably the congestion in the East River tunnels which connect Manhattan and Long Island.

Between 8 and 9:30 a. m. a large number of Pennsy trains arrive from the West. These discharge their human cargo and continue to the Sunnyside terminal. Their movement coincides with the morning rush of Long Island commuter trains carrying workers to the city. In that hour and 30 minutes a train passes east or west through the four tunnels at the rate of one every 36 seconds. A similar condition takes place between 4 and 5:30 p. m., when the westbound trains are moving into the station to pick up passengers as the weary suburbanites retrace their paths homeward. On a recent count the tunnels had more than 1400 train movements in a single day.

The main line of the New York Division, over which this colorful array of famous trains passes, is one of the most vital arteries of the entire Pennsylvania System. Extending from the heart of Manhattan to Liddonfield, Pa., it traverses one of our most productive industrial areas, serving a densely populated section of New Jersey and Pennsylvania, and providing a continuous transportation service pre-eminent in the railroad field. Over this line most of the Pennsylvania's crack express trains and heaviest freight traffic are operated.

From New York City to Liddonfield is 76 miles—by Pennsylvania standards, 75 minutes. At least three of the blue-ribbon expresses make the trip in 1 hour 15 minutes, including a stop at Newark. All through trains from New York go to North Philadelphia, which is 86 miles from Penn Terminal, and from there the southbound trains proceed to the new Thirtieth Street Station and then to Baltimore and Washington. Trains bound for Philadelphia go into the Thirtieth Street Station and thence to the old Broad Street Terminal. The westbound trains proceed directly from North Philadelphia to Harrisburg. The Philadelphia area is under the control of the Philadelphia Terminal Division; southward is the Maryland Division and westward the Philadelphia Division. Passenger train crews handle trains from Sunnyside through to

Washington or Harrisburg, or to Philadelphia (Broad Street Station), depending on the train's destination. Local passenger service is maintained from New York to New Brunswick, Trenton, or Philadelphia direct. On the short local runs multiple-unit type cars are used, operated in trains of from two to nine cars.

A study of the through service is of considerable interest. On week-days except Sunday there are 58 express trains out of New York for Washington or Pittsburgh and beyond. There are also 14 "clockers" for Philadelphia, two expresses for Atlantic City, seven locals for Philadelphia and eight for Trenton, 28 trains for South Amboy, New Brunswick or seashore points, and five Lehigh Valley trains. Approximately the same number of trains arrive each day.

For schedule purposes, the employees' official time card lists Holmes as the west terminus of the main line; this is an interlocking plant 78.3 miles west of the New York station. The average running time of all through expresses between these points is 1 hour 30 minutes westbound, and 1 hour 31 minutes eastbound. The average time for the clockers is two minutes faster westbound and four minutes faster eastbound, although practically all of these make a stop at Trenton in addition to the Newark stop.

Westward the fastest time over the division is made by the *Congressional*, the *St. Louisan* and the *Broadway Limited*, and is 1 hour 19 minutes. Eastbound only one train makes this time: the "*Congo*," as the *Congressional* is locally nicknamed. With the exception of the *Edison* and a solid Railway Express Agency train, all stop at Newark westbound. Eastbound quite a number make this stop only conditionally. At North Philadelphia all westward trains make a stop excepting the *Edison*, the solid Railway Express (No. 1), and No. 181, a Boston-Philadelphia (Broad Street) express-mail train. The *Edison* is a solid sleeper train for Baltimore and Washington; eastward, however, it handles one coach in addition to the sleepers. Eastbound the *Chicago Mail* (No. 18) does not make the North Philadelphia stop. This station is a conditional stop for a number of the better eastbound trains. Many western and southern trains stop at Trenton; a few stop at New Brunswick or Princeton Junction.

Trains for the South are usually very heavy, the *Legislator* carrying 17 cars, the *Representative* 16 or 17, and the *Embassy* 18. Many others carry from 12 to 15 cars. On the Western runs the *Metropolitan* frequently has up to 18 cars as far as Philadelphia, the *Red Arrow* 17, the *Clevelander* 14. Many others haul from 10 to 14 cars. The following trains carry tail signs: *Broadway Limited*, the *Spirit of St. Louis*, the *Pittsburgher*, the *Jeffersonian*, the *American*, the *Trail Blazer*, the *President*, the *Congressional*, the *Silver Meteor*, and the *Southerner*.

Practically all of the through passenger trains are handled with the GG-1 class streamlined electric locomotives. There are 90 of these in passenger service together with six O-1 class and one R-1 class, also electrics. When the division was first electrified, trains were handled with the box-cab P-5a class motors which were non-streamlined. Later 28 streamlined P-5a engines were placed in passenger service. These and the 91 box-cab engines are now in freight service. In addition, 29 GG-1's are used in freight work. There is one P-5b and one DD-1 type also in freight service.

A glance at the public timetable will show that a number of trains come to the division via the New Haven from Boston or Springfield. About 60 years ago a service was operated from New England to Washington by ferrying the cars on transfer steamers from the Harlem station of the New Haven to Jersey City terminal. About this time observation cars were placed in service on the *Pennsylvania Limited* and *Congressional*. These cars were longer than the engines of that day, and the turntable at the Waldo Avenue engine house in Jersey City was too short to accommodate them. It was therefore necessary to take the cars to the nearest wye, several miles from the Jersey City stub style station. One day it occurred to someone that the cars could be run onto one of the transfer steamers, the steamer turned in the river, and the cars returned to shore headed the right direction. This saved the long run to the wye.

DIVISION headquarters are located in the old passenger station-office building in Jersey City, a holdover from the days when this was the eastern terminus of the main line. The building is at present undergoing extensive alterations.

Under the jurisdiction of the division are

operated a total of nine companies by a long-term lease, and a small part of the Pennsylvania Railroad itself. The division has 326 route miles: in New York State 6 miles, in New Jersey 299 miles, in Pennsylvania 21 miles. There are 326 miles of first track, 160 miles of second track, 77 miles of third track, and 77 miles of fourth track. In addition are more than 772 miles of sidings and yard tracks, making a total of more than 1412 miles. The division has trackage rights over the National Docks Railway (Lehigh Valley), Central Railroad of New Jersey, New York & Long Branch, and the Delaware, Lackawanna & Western. These rights total 58 route miles, covering 172 miles of track. The New York Zone, of which the New York Division comprises all operating lines, also controls 423 miles of associated lines which include the New York & Long Branch (a joint operation with the CRR of NJ), and the Long Island Railroad.

On the main line of the division the route mileage is as follows: in New York 6 miles, in New Jersey nearly 58 miles, and in Pennsylvania about 18 miles. From Sunnyside to a point near Harrison, N. J., the leased company is the Pennsylvania Tunnel & Terminal Company. From Harrison to the center of the Delaware River at Trenton the line is owned by the United New Jersey Railroad & Canal Company, and the remaining west end of the main stem belongs to the Philadelphia & Trenton Railroad Company.

The spacious Sunnyside coach yard sprawls over about 153 acres and contains 89 tracks, accommodating approximately 1200 passenger cars. It has complete facilities for stocking diners, and can clean and put to order better than 3000 passenger cars every day. Complete storehouses, battery house, oil house, engine house, carpet shed and commissary are maintained. An interlocking system manned from four towers controls the yard. The express terminal, capable of handling 300 vehicles at one time, is located here and was built at a cost of about 2½ million dollars in 1926.

Sunnyside is connected to the New York station by four singe-track tunnels that pass beneath a part of Long Island City, the East River and the island of Manhattan. They are

W. R. Osborne.

Across the Meadows.

Every train entering or leaving Pennsylvania's New York City station from the West must use this double-track high line across the Jersey Meadows to Newark, which thus ranks as the busiest double-track railroad. Since all trains on this line are passenger, and there are no stops, the traffic flows evenly and continuously, enabling the two tracks to carry a volume far beyond the usual capacity. Both tracks, at first third rail, are now trolley-operated.

W. R. Osborne.

about 13,000 feet in length, of which 8280 feet is tangent (straight). Ventilating shafts 80 and 76 feet deep are located in Long Island City and at First Avenue in Manhattan. Beginning with the most southerly tunnel they are numbered 1, 2, 3 and 4, and it is interesting to note that No. 2 and No. 3 cross each other between portals. Maximum tunnel grades are about 1.5 per cent. At the west end, where they enter the New York station, are two interlocking plants, each controlling two tunnels, and located on opposite sides of the station. There are two other interlocking cabins in the station. One, KN, located on the north side of the tracks, commands movements of Long Island trains only, and the other, A tower, which is located at the westerly end of the station, controls that end together with the lines as far west as the Hackensack portals, as the west end of the Hudson River tunnels are designated.

THE Pennsylvania Station was opened in 1910, fulfilling the dream of President Alexander J. Cassatt, who unfortunately did not live to see its completion. Requiring more than six years to construct, and costing about 105 million dollars, this building covers more ground than any other single structure in the city of New York. Five hundred buildings were demolished to make way for its construction. Covering more than eight acres, it harbors an additional area of about 28 acres of yards, most of which is hidden beneath the city streets. These underground tracks have a capacity of about 200 cars. The station is served by 24 tracks, three of which are used exclusively for mail, which is conveyed direct between cars and the main post office located above on Eighth Avenue. The longest passenger platform, No. 6, extends nearly a quarter of a mile. Twenty-two hundred people spend their working day beneath the roof of this station. Only about 500 of these work for the Pennsylvania. Most of them never see, or even hear, the trains.

On March 9, 1917, the first train was operated over the New York Connecting Railroad between Pennsylvania Station and the New York, New Haven & Hartford via the Hell Gate Bridge route, and since that time New Haven trains have shared in the Pennsylvania Station at New York. Baltimore & Ohio trains used the Penn Terminal in Manhattan from 1918 to 1926 and Lehigh Valley trains have used the facilities since 1918.

From this terminal a passenger can board a train direct for more points in the United States than in any other railroad station in America. Every year 15 million use the Pennsylvania, nearly a half million come and go on the Lehigh Valley, a million use the New Haven, and 55 million ride in and out on the Long Island trains.

Connecting the station to the outside world on the west are two single-track tunnels extending a distance of 13,685 feet, of which 12,500 feet is tangent. The first portion of these tunnels lies under Manhattan and the Hudson (North) River. This section is over 6460 feet long and has three curves. The maximum grade in the tunnels on this section is 1.93 per cent. The second portion lies under the Bergen Hill section of New Jersey and is about 6000 feet long with one curve. Maximum grade in this portion is 1.3 per cent. The North River tunnels have two ventilating shafts, one at Eleventh Avenue, Manhattan, which is 65 feet deep, and the other in Weehawken, N. J., with a depth of 75 feet. The maximum depth of the tunnels below the river bed is about 44 feet to their invert. They are constructed of steel, brick and concrete, and are 19 feet in diameter. Principally they are ventilated by the piston action of the trains as they move through the tunnels, forcing the air ahead of them and out the shafts. In addition there are 14 electrically-operated

Gateway to an empire.

Through the columned entrance to Pennsylvania Station on Seventh Avenue in New York City may walk a passenger for a through train to New Orleans, or a commuter to Long Island, for from this gateway one can take trains to more places than from any other station in the country. Far below street level is a complicated through type track layout, with 24 platform tracks, having a much higher train capacity than a similar number of tracks in a stub station, and several small yards.

fans which, if required, can deliver fresh air at tornado velocities.

From the Hackensack portals a double-tracked high line extends to a point near Harrison. Going west, there are four tracks from this point to Liddonfield with the exception of that section from Elmora interlocking at South Elizabeth to Union tower near Rahway, which consists of six tracks for a total distance of about 5½ miles. This six-track section was completed in 1915, the work including the elimination of 15 grade crossings and the erection of a new passenger station at Rahway.

Just before the line reaches Newark it crosses the Passaic River by a huge drawbridge. Bridges of this type are quite numerous in the New York area, as the main line crosses both the Hackensack and Passaic Rivers, which are navigable and hence require bridges that can be opened for the passage of vessels. Several other lines, mostly the freight routes, cross the rivers at various points.

The Passaic draw is an engineering masterpiece, and is a bridge within a bridge. It is over 520 feet long and can be raised as high as a 10-story building in 85 seconds, providing a clearance of 135 feet above mean high tide. Trains of the Hudson & Manhattan Railroad use this bridge on their route between Newark and New York. This railroad maintains direct connections for passengers who wish to go or come from downtown New York, and has fast, frequent service between Newark, Hoboken, Jersey City and New York. Locally this line is known as the "tubes" and was built in 1909 from downtown New York (Hudson Terminal) to Exchange Place (P RR. Station), Jersey City. In 1911 it connected into the P RR. at the Manhattan Transfer mentioned elsewhere, and in the latter part of the same year extended its lines to Park Place, Newark.

At Newark stands a monumental structure built by the joint efforts of the Pennsylvania Railroad and the city of Newark. This station was opened in 1935 and is one of the most modern designs in America. All Pennsylvania and Lehigh Valley trains run through this station, and passengers can interchange between the railroad trains, city trolleys, busses, taxis and tube trains without leaving the building.

A short distance west of Newark, at Hunter interlocking, the main line connects with the Lehigh Valley Railroad. Trains of this road are operated direct to New York station via Newark by electric locomotives of the Pennsy.

At New Brunswick the main stem crosses the Raritan River on a beautiful stone arch bridge. Both through Newark and New Brunswick the line is elevated and has no grade crossings. Beyond New Brunswick the line lies in open farming country, and the Delaware River is spanned by a structure similar to the New Brunswick bridge a short distance west of Trenton.

Trenton, a thriving industrial city and the capital of New Jersey, is a very important point on the division. It is the junction of several branches, and the road maintains a steam engine terminal here for branch line services. The Atlantic City expresses change over from electric to steam power at this point.

West of the Delaware the line continues through rural surroundings which give way gradually to the industrial beehive that surrounds Philadelphia. Beyond Holmes tower the road passes Frankford Junction, at which point the Philadelphia-Atlantic City trains leave the line and proceed via the Delaware River Bridge route. Some train service of the New York Division is maintained over this bridge, the trains operating locally from Trenton to Philadelphia via Bordentown, Burlington and the aforementioned bridge route.

GRADES on the main line are, with the exceptions of the tunnel gradients and the heavy approach grade to a bridge in the Newark area, rather light and of a rolling nature. Mostly they are under 0.3 per cent. From New York to Metuchen the curves are rather numerous but not very sharp, other than one near Elizabeth on which a restricting speed of 55 miles per hour is in force. Elsewhere, with but few exceptions, passenger trains are permitted to operate on the main line at 75 miles per

hour. From Mommouth Junction to Trenton the line is almost entirely on tangent. On the west end of the main are a few curves of medium sharpness.

A rail-laying program is in progress and 152-pound steel is being installed west of Elizabeth. East of this point, and at certain restricted overhead clearances westward, the line is laid with 131-pound rails. Rails are 39 feet in length and an interesting feature is the mechanized equipment used in placing the new track. The division is experimenting with rubber tie plates and has placed them on the No. 3 track through the Newark station. They may be installed at other points in the future. On the branch lines of the division rail weights vary from 85 to 100 pounds. The Bordentown Branch and the Belvidere-Delaware line consist principally of 130-pound rail.

On a railroad having such fast and frequent service a signal system must of necessity be elaborate and infallible in operation. In 1863, shortly after a serious wreck on the main line, a block signal system was placed in operation. Before 1870 this system was fairly well established and telegraph was being used for tower communication. The old banner type signals were at first used and later these were replaced with semaphores, which were removed to make way for the present position light type signals installed during the electrification program. Today position lights are used over the entire main line except in the tunnels at New York, where, due to the limited clearances, color light signals are employed. On the branch lines many position lights are in place and all replacements as needed are of this type.

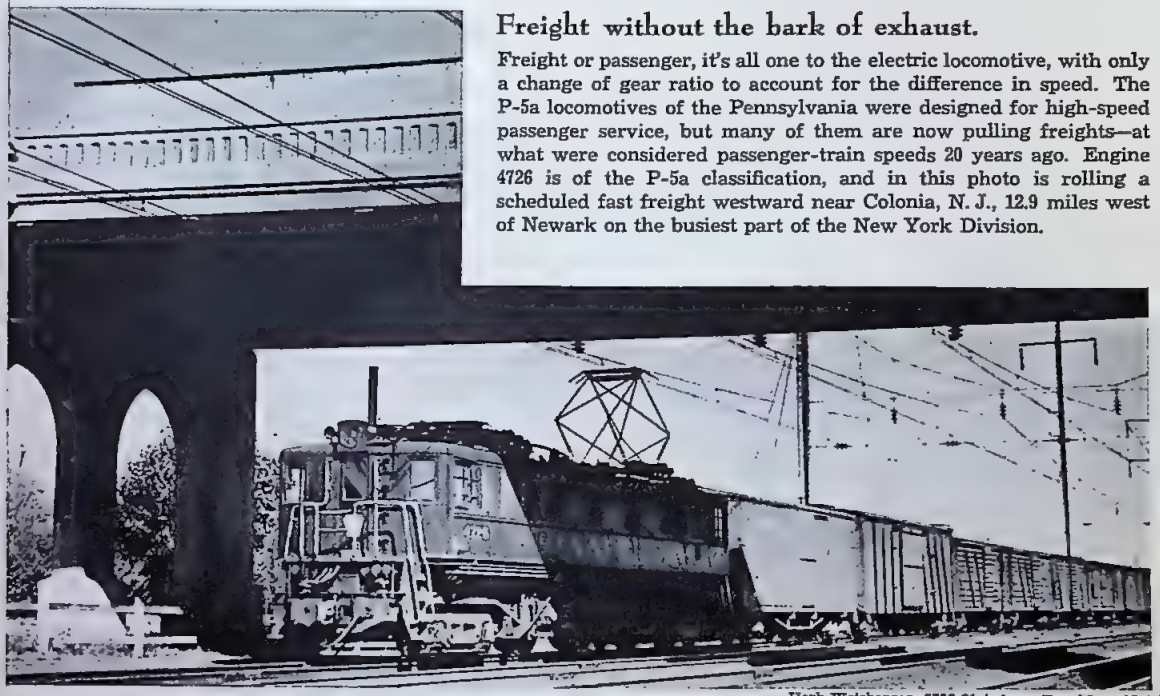
The entire main line is protected by a dragging equipment detector installation located at 10 points between Newark and Philadelphia. Anything dragging between the rails sets the block signals at danger.

In operation on the main line, the Trenton Cutoff, the Jersey City-Harrison connection, and the Perth Amboy Branch, is Union Switch & Signal equipment in the form of four-indication, continuously-controlled cab signals. This cab signal system is the safest known method of signaling and provides clear, accurate and instant information (with any change) to the engineman at all times. It permits high-speed operations with a minimum of headway and a maximum of safety. Automatic train control has been used on the division but has been discarded with the approval of the I. C. C. The railroad officials believe that a certain amount of responsibility on the engineers is desirable and increases their alertness.

In 1872 there were 20 trains between Jersey City and New Brunswick and 20 to Philadelphia. Between New Brunswick and Trenton 17 were operated and between Trenton and Philadelphia 24. Thirteen signal towers were in operation between Jersey City and New Brunswick and 12 more were scattered from there to Philadelphia. An interlocking plant was installed at Trenton, the first of its kind in America. Soon after this installation another plant was opened at Newark Junction, and it is interesting to know that this latter equipment is on display in the Franklin Institute in Philadelphia. An indication of the development of signaling and train control since 1872 is at once evident when it becomes known that the present large volume of traffic is successfully controlled by 16 interlocking plants between the North River and Holmes. These are of the most modern design and of the electro-pneumatic type. Prior to 1935 these plants were designated by the usual call letters, but in that year the cabin letters were changed to names appropriate to their locations in many instances. Some branch line towers are still assigned letters. Telephones are used exclusively for communication.

TO MANY old-timers on the New York Division, and to many railfans living in its vicinity, April 8, 1933, was a sad day. For more than 20 years steam power had pulled the *Broadway Limited*: first the light Atlantics, later the E-6's and then the sleek K-4's. But progress was marching along and so on that Spring afternoon No. 29 made her last westbound trip over the division hauled by these fiery iron horses. Electric power was taking over. Steam had done a tough job well but traffic was increasing, the trains were getting heavier and had to go faster, and Pennsylvania experts said electrification was the solution.

When the New York tunnels were in the embryo stage in 1892 one of the plans was to haul the trains through these tubes by cable power, but by the time the tunnels had been built electric motive power was decided upon as a practical method. Electric operations had been in the experimental stages on the road



Freight without the bark of exhaust.

Freight or passenger, it's all one to the electric locomotive, with only a change of gear ratio to account for the difference in speed. The P-5a locomotives of the Pennsylvania were designed for high-speed passenger service, but many of them are now pulling freights—at what were considered passenger-train speeds 20 years ago. Engine 4726 is of the P-5a classification, and in this photo is rolling a scheduled fast freight westward near Colonia, N. J., 12.9 miles west of Newark on the busiest part of the New York Division.

Herb Welsberger, 8798 21st Ave., Brooklyn, N. Y.

for several years, and had proved satisfactory. A direct current system using third rail was adopted and is still used on the Long Island Railroad.

For a number of years electric power had been under consideration for main line use. Its adoption would permit the existing trackage to handle a greater volume of traffic, would quicken schedules, eliminate the smoke nuisance which was a hazard to train operations and a great source of annoyance to the communities along the line, improve the comfort of passengers, and increase safety of operation. Not only would the trains be handled much more smoothly but in a manner more flexible and less injurious to the rolling stock. In addition, time has shown that the need for stand-by equipment can be reduced to a minimum on account of the efficiency and stamina of the electric locomotive. Under steam operation, movements were kept up to about 91 per cent on-time performance; electric operation has increased this to 99 per cent.

In 1930 electric operation was started on the main line between Trenton and Philadelphia, and through main line service was initiated between New York and Philadelphia in 1933. The *Congressional* opened complete electric operation between New York and Washington on February 10, 1935. At first the western trains were electrically operated only as far as Paoli, Pa. Later this was extended to Harrisburg and today electric locomotives handle trains direct from Sunnyside to Washington or Harrisburg.

When the New York station was placed in operation trains were electrically pulled from that city to Manhattan Transfer, about nine miles west of the terminal. At this point steam took over and a large steam engine terminal was maintained at Meadows engine house nearby. The Transfer was discontinued on June 20, 1937, and effective that date all trains moved without motive power interruption over the entire division and beyond. The tube trains mentioned elsewhere also discontinued service to the Transfer and began using the new Newark station.

The main line electrification is a high voltage alternating current overhead system. From the transmission line, carrying 132,000 volts, the current is stepped down by a dozen substations distributed along the line to a voltage of 11,000 on the trolley wire. (The same voltage is used by the New Haven.) This is then picked up by pantographs on the locomotives and transformed down to the 960 volts which operates the driving motors. Practically all of the power is received from commercial sources, and the necessary fre-

quency-converter stations are owned and operated by these public utility concerns. The entire system is so designed and constructed that regardless of any ordinary accident to the system the power supply to the trains will be maintained. The various substations are automatic in their operation and auxiliary equipment is cut in for stand-by and actual operation without human attention. Power directors located at strategic points keep a constant vigilance and check on the electrical supply required and delivered to the trains.

When electrification on the New York Division was being completed the overhead system was continued eastward from the Transfer to Sunnyside; however, a third rail has been retained in the North River tunnels for emergency operation if necessary. Third rail is also maintained east of the New York station.

As a part of the electric program a good portion of the metropolitan area yards has been wired and many of the connections to the branches from the main line have been equipped for switching purposes.

The New York Division has a total of 144 route miles electrified, which includes all of the main line through tracks. There are slightly over 618 miles of electrified tracks, or approximately 28 per cent of all the electrified trackage on the Pennsylvania Railroad.

WE HAVE dwelt at length on the passenger service of this busy division, but there is another service which is probably of greater importance to the public, and certainly more profitable to the railroad company. This is the handling of freight. No longer does the humble freight train ramble in a plodding fashion over the line. The days of the slow drag are passing and nearly every freight train is now a hotshot. Here again electric power has done wonders.

From Greenville Yard to Holmes, first NE-1, the *Speed Witch*, covers the 71 miles in about two hours; from Waverly Yard near Newark to Holmes, symbol freight *MD-1* strolls along at better than 43 miles per hour average. Many other freights cover the division in about two hours. Two run from Holmes to Waverly in 1 hour 30 minutes. The maximum permissible freight train speed on the main line is 50 miles per hour.

Every 24 hours more than 50 freights arrive and depart from the eastern terminals. Solid trains of reefers, coal cars and general merchandise roar eastward and westward hauled by the severe electric giants. In one day recently more than 5000 freight cars passed Monmouth Junction. Think of it—more than 42 miles of cars!

As would be expected, Pennsylvania freight facilities in the New York area are of an expansive nature. Waverly Yard, built in 1902-05, is a classification, carload and l. c. l. yard with hump. Greenville takes a large amount of general freight for New England and also has hump facilities. Float service is maintained across the harbor from this yard to Bay Ridge in Brooklyn. Harsimus Cove at Jersey City handles perishable freight for Manhattan, and live stock and coal. Meadows Yard is principally a coal storage point and a make-up yard for westbound empties. At Morrisville is an extensive area laid out in yard and used as a classification point back in 1918. At present it is inactive, as is Garden Yard near Newark.

When dense fog blankets New York Harbor the float service to Brooklyn and Manhattan is often seriously slowed, and at times completely disrupted. If this condition prevails for any great period of time (a day or more), freight trains are dispatched through the tunnels. Such freight is limited to 30 cars per train and the cars must meet certain requirements as to load and type of equipment. These trains are not permitted to exceed 20 miles per hour.

Off the main stem are several important freight yards including the great South Amboy terminal from which enormous quantities of coal are shipped by water. Yards are also located at Old Bridge, Trenton, and Phillipsburg.

Through freights are operated from the metropolitan yards to Washington (Potomac Yard) and Harrisburg (Enola). One Harrisburg freight moves via Philadelphia; the others use the Trenton Cutoff. Unbroken freights also operate between the New York area and Baltimore; Phillipsburg and Harrisburg; Trenton and Camden; Camden and New York area via Trenton; and South Amboy and Harrisburg by way of Trenton and Jamesburg.

IN THE days before the New York station came into existence the eastern terminus was at Jersey City, and a double-tracked electrified line connects this old station with the present main line near Harrison. Most of the traffic is now composed of commuters.

Most of the several short branches in the Newark area are lines connecting yards which serve that territory. One of these is the tiny 0.2-mile line owned by the United New Jersey Railroad & Canal Company. It is the Harrison & East Newark Connecting Railroad Company, is single track and steam-operated. The three most important freight lines around Newark and Jersey City are the Passaic Branch running from Waverly to the Meadows, a line off the old main line into Jersey City extending to the Harsimus Cove Yards, and the line from Waverly to Greenville piers. The latter is the New York Bay Railroad Company, formed in 1890 by a consolidation of the Waverly & Passaic Railroad and the Waverly & New York Bay Railroad. All three of these lines are double-tracked and electrified.

From Union tower near Rahway, the Perth Amboy and Woodbridge branch extends to a connection with the New York & Long Branch Railroad, over which are operated many trains for seashore resorts. It is double-tracked and electrified.

The short Bonhamton Branch leaves the main line at Edison tower near Metuchen, and extends about two miles southward. It is single track and steam-operated.

Just west of New Brunswick, at County interlocking plant, a single-track steam-operated branch extends 6.5 miles westward to East Millstone. Years ago through passenger service was maintained from Millstone to Jersey City. Later a local service was provided with three trains each way on week days to Millstone Junction, but in recent years only freight has been hauled over the Millstone Branch.

At Monmouth Junction (Midway Tower) the Rocky Hill Branch begins. The portion to Kingston is owned by the United New Jersey Railroad & Canal Company and the remaining road to Rocky Hill is the property of the Rocky Hill Railroad & Transportation Company. Like the Millstone Branch, this line once boasted through passenger service to Jersey City which later deteriorated into local service as far as the junction. At present a daily freight service is in operation. It is a single-track line and steam power is used. This branch between Kingston and Monmouth is a part of the Camden & Amboy as originally constructed between Trenton and New Brunswick and abandoned as main line when the road was rebuilt from Trenton to Deans in Civil War days.

Eastward from Monmouth Junction is the Jamesburg Branch, which connects at Jamesburg with the Bordentown and South Amboy route. Heavy freight traffic uses this line en route to South Amboy and passenger trains operate over it for seashore points. It is double-tracked and electrified.

The Freehold & Jamesburg Branch extends from Jamesburg to Manasquan via Freehold, and seashore trains operate over it to Sea Girt, where a connection is made with the New York & Long Branch. It is a single-track line and steam equipment is used. The Jamesburg Branch is about 5.5 miles long and the Jamesburg-Manasquan line is over 27 miles in length. The latter is the old Freehold & Jamesburg Agriculture Railroad.

Princeton is located on a branch by the same name, which connects that town with the main line at Princeton Junction. Local passenger service is maintained and the line is electrified and practically double-tracked. The interlocking plant at Nassau controls this connection. When the great varsity teams meet in Palmer Stadium at Princeton University the quiet little branch becomes a throbbing line with main line proportions. For the big pigskin events as many as 30 specials are operated direct to Princeton from various cities. These trains have from 12 to 16 cars each, and the coach yards at Princeton are designed to accommodate this rush of traffic.

Years ago passenger service was operated from Princeton direct to Jersey City. An interesting story in connection with this service

Tourist sleepers.

On many Western trains tourist sleepers are provided at slightly more than half the standard Pullman space rates. These are usually older Pullman cars, have 16 sections, are air-conditioned, and the furnishings are plain, neat and clean. Railroad tickets good in tourist sleepers cost, in most cases, less than first class.

was related to me by an old engineer. As a young man he fired on this run and his engine was kept overnight at Princeton. Said he, "It was nothing unusual to come to work in the morning and find a part or two missing from the locomotive." The engine was somewhat of an experimental type and the inquisitive (and playful) college students frequently helped themselves to various parts.

Several branches extend out of Trenton, and one, the Millham, is a part of the original Camden & Amboy line between Trenton and New Brunswick. Another is the old Enterprise Railroad, built in 1885 and having a length of about 1.5 miles. Today these two are more or less industrial sidings.

Between Trenton and Bordentown is a double-track steam line over a portion of the original C&A. The New York-Atlantic City expresses use this line out of Trenton, as do the local Camden trains and Philadelphia trains which operate via the Delair Bridge route. This branch is about six miles long and parallels the old Delaware & Raritan Canal most of its distance.

From Morrisville to Dunlap is the double-track electrified freight line known as the Trenton Cutoff. Officially known as the Trenton Branch, this line, insofar as New York Division supervision is concerned, is about 4.5 miles long. Built in 1892 and double-tracked the following year, a passenger service was at one time operated from Morrisville to Chestnut Hill. Today it is exclusively a freight route and carries the heavy Western business.

Out of Bristol is a single line used for industrial purposes and about 2.5 miles long. Slightly over one mile is electrified.

The line from Camden to South Amboy by way of Bordentown and Jamesburg is a part of the oldest road in New Jersey. With but slight changes it follows the original Camden & Amboy. The New York Division territory extends as far south as Minson. With the exception of the single track that runs through the streets of Burlington, the line is double track from Camden to Bordentown. From Bordentown to Jamesburg and on north to Old Bridge it is single track and thence a double track extends into South Amboy. South of Jamesburg it is steam-operated. Before the old C&A was extended to Trenton, passengers for that city changed cars at a place called Sand Hill. Here they took the stage for the state capital. In 1850 Sand Hill was given the more polished name of Yardville. From Minson, where the Atlantic Division joins the New York Division, it is 21 miles to Bordentown and 20.5 miles from there to Jamesburg. To South Amboy is an additional 13 miles. Bordentown to Jamesburg is operated for freight service only.

PROBABLY the most interesting branch of the whole division is the picturesque line which follows a tortuous route through the Delaware River Valley from Trenton to Manunka Chunk. Commonly called the "Bel-Del," this line is the property of the Belvidere-Delaware Railroad Company and is a single-track, steam-operated route. Over the entire 67-odd miles it climbs with an almost continuous grade. Between its terminals, trains swing around more than 130 curves, one at Riegelsville being more than two miles long while another, near Raven Rock, is practically a reverse and is three miles in length. Passenger service is operated from Trenton to Phillipsburg with some trains running beyond to Stroudsburg over a connection at the northern terminus with the Delaware, Lackawanna & Western. The route is a heavy freight carrier and has two branches running from the main stem. One short connection crosses the Delaware River and goes to Martin's Creek and the other is the 12-mile line from Lambertville to Flemington. The former is known as the Martin's Creek Branch and the latter is the old Flemington Railroad. The Martin's Creek Branch consists of the Martin's Creek Railroad of New Jersey and the Martin's Creek Railroad of Pennsylvania and was completed in 1885, forming a connection between the Bel-Del and the Bangor & Portland Railroad.

In 1870 a line was constructed between Somerset Junction, on the Bel-Del, and Millstone, a distance of about 22.5 miles. This road, the Mercer & Somerset, was acquired by the Pennsylvania in the leased agreement with the United Companies. It was sold at public auction in 1879, rails were taken up in 1880, and today little evidence remains of its existence. At a point near Hopewell this line crossed the proposed route of what is now the Reading System's Philadelphia-New York line. Under construction as the Delaware & Bound Brook, this competitive line was the cause of much trouble with the M&S, and many arguments arose and even fights took

place. In 1976 a minor battle was fought between the forces of the two roads, reinforced by local farmers. This will long be remembered by railroad historians as the "Frog War."

A projected freight line (Pennsylvania & Newark Railroad) designed to by-pass Trenton for the use of through freights has been under consideration for many years. Although abutments and piers have been built for the crossing of the Delaware below Trenton it is doubtful if the line will ever be built.

THE early history of the lines constituting the present New York Division is of great interest, particularly so because a portion of the division includes New Jersey's pioneer railroad, one of the first in America.

One hundred and ten years ago, on a bright autumn day, a tiny steam engine named *John Bull* tugged its small train over a short section of track near Bordentown. Hauling members of the state legislature, it demonstrated with much fuss and commotion that steam railroads were practical. Although two or three short steam roads were in operation in the country, the New Jersey fathers were firm believers in the canals as a standard and more reliable method of transportation, and like the proverbial Missourian "had to be shown" before they would believe.

John Stevens of Hoboken had toiled for 20 years to bring about this momentous event. As early as 1811 he had requested a charter to construct a railroad, and while the legislature did grant him the first railroad charter in America in 1815, financial difficulties interfered with the construction of a line until 1830. In that year a charter was granted authorizing a railroad to be constructed from a point near Cooper's Creek (Camden), to a point on Raritan Bay. On the same day that the railroad charter was granted a similar grant was made for the construction of a canal that was proposed to run from a point near Trenton to New Brunswick.

The amount of stock sold by the two companies in the first few days clearly indicated that the public was impressed by the railroad project to a greater extent than the proposed canal line, and the canal company, headed by Robert F. Stockton of Princeton, sensing a serious menace, called on the legislature for a permit to construct a railroad from Trenton to New Brunswick. This the legislature refused to do, but it passed a supplementary act forbidding the construction of a railroad within five miles of the canal route until after its

Leaving New York.

Fifty feet below the sidewalks of Manhattan a Pennsylvania electric locomotive pulls out to the west with a passenger train. The west end of the station track layout is controlled by a single signal tower, and all tracks converge into two main line tracks through the Hudson River tunnels.

Courtesy Pennsylvania Railroad.

Union Switch & Signal Co.

Hackensack portals.

After its brief dive under the bottom of the Hudson River, a Pennsy passenger train emerges into New Jersey sunshine through the Hackensack portals in the side of this wooded hill. When overhead trolley wire was installed in the tubes, which had originally been planned for third rail, the track bed was actually lowered into the tunnel floors and the trolley supports cut up into the ceilings in order to provide clearance. Third rail was left for emergencies.

completion, and extended the canal charter for 50 years.

In the Summer of 1830 surveys were started under the direction of Maj. John Wilson, U. S. Army, for the purpose of selecting a route for the newly formed Camden & Amboy Railroad; and Col. Robert L. Stevens, son of John Stevens, and first president of the railroad, journeyed to England to make arrangements for the purchase of rails and motive power for his company. In the Fall of the same year actual construction got under way at White Hill, near Bordentown, and the Delaware & Raritan Canal Company began excavations near Kingston on its project.

Foreseeing trouble between the two companies, Stevens and Stockton consolidated their stock in 1831 with the understanding that each company would construct its own lines.

The first shipment of rails was made to Philadelphia in May, 1831. In Wood's *Treatise on Railroads*, published in 1832, he discussed these rails, of a type new to railroad practice in England. He noted that they were of cast iron, were 16 feet long and weighed about 39 pounds per yard. The book gives the following dimensions: width on top, 2⅛"; bottom, 3¼"; depth, 3½"; neck, ½".

Of interest is the fact that this rail design was the idea of Col. Stevens, who with great difficulty persuaded the Guest Iron Works in Wales to attempt to roll rails of this design; fundamentally they are of the same style as used today. Shortly after the first shipment the weight was increased to a 42-pound section.

Col. Stevens also designed the hook-headed spike, iron tongues (fishplates), and rivets (bolts and nuts) necessary to complete the rail fastenings. At first the rails were laid on granite blocks, but Stevens became impatient when shipment on these was delayed and decided to use logs with broken stone packed around them as a substitute. To this day all of these features have been retained for standard railroad track with but slight modifications.

The *John Bull* had been received from the Robert Stephenson Works and was assembled by a young mechanic named Isaac Dripps during the Summer of 1831. Although it made the demonstration run as mentioned, for various reasons it was not placed in regular service until September, 1833. The line had been opened from Bordentown to Hightstown in 1832, and an item in the *New Jersey State Gazette* of October 6, 1832, reads, "Gliding in fine style rapidly along the rails, drawn by two horses in tamden harness . . ."

The line was completed northward to Amboy in February, 1833, and by 1834 was extended southward to Camden. This latter stretch was of cheaper construction, as it was intended only for use in Winter, when the river was closed by ice. A single-track railroad with 21 turnouts now extended from a point opposite Philadelphia to Raritan Bay. It was the longest piece of railroad in America. The gauge on this road was 4'-10", and this gauge remained until the eighties. All New Jersey railroads used the wide gauge for convenience, if not necessity.

The first passenger cars were built at Hoboken and resembled the English type compartment cars of that date. They seated from 18 to 24 persons. Within the next few years the Camden & Amboy acquired 14 more locomotives from England, and the faithful *John Bull*, now preserved at Washington, remained in service for more than 30 years.

Meanwhile, on March 7, 1832, the New Jersey Railroad & Transportation Company had been incorporated. Its charter granted it permission to build a railroad from Jersey City to New Brunswick. This line was opened to Newark in September, 1834, using horses as motive power. The north bank of the Raritan opposite New Brunswick was reached in 1836

with the line passing through Elizabeth Town and Rahway. The Hackensack and Passaic River crossings between Jersey and Newark were accomplished by gaining control of the Hackensack & Passaic Bridge Company and the Newark Turnpike Company, and for several years the cars were operated over the old turnpike structures. The heavy excavation at Bergen Hill was made jointly with the Paterson & Hudson River Railroad Company.

In the Keystone State the Philadelphia & Trenton Railroad was chartered in February, 1832, and a line was completed from Morrisville (opposite Trenton) to Brystol (Bristol) the following year. In 1834 this road was extended to Kensington and on November 1 of that year an excursion train carrying interested citizens covered the 28-mile trip between these points in 1 hour 30 minutes.

This railroad desired to connect with the New Jersey Railroad at the Raritan River, and, having purchased a majority of the stock in the Trenton & New Brunswick Turnpike Company, began laying rails over this company's road. The Camden & Amboy objected to this, and the joint companies of Stevens and Stockton bought the controlling interest in the P&T and the turnpike company so that the proposed extension would not be made.

In 1837 the C&A was authorized to build a line from Bordentown to New Brunswick via Trenton, and this line was completed as far as the latter town in 1838, the same year in which the first train of the New Jersey Railroad entered New Brunswick, running via the Albany Street Bridge owned by the New York & Philadelphia Turnpike Company. It went to the new depot on Somerset Street. Later the bridge was rebuilt by the railroad and was used until destroyed by fire in the Winter of 1878. An iron bridge was then constructed and remained in service until the present high-level stone arch was built in May, 1903.

The panic of 1837 held up the section of the C&A between Trenton and New Brunswick but this stretch was built in the following year and rails were joined with the New Jersey Railroad at a point 3.5 miles south of New Brunswick in 1839. The final link was completed from Trenton across the Delaware River, connecting with the P&T RR. in 1839. An iron trail now extended from the Hudson River to Philadelphia, and the first train ran between these points in 1840 in slightly more than six hours.

BY THIS time the Camden & Amboy was a prosperous railroad. It owned 16 locomotives, 64 passenger cars, 7 baggage and 64 freight cars. Two special cars were fitted with rocking chairs for the comfort of the ladies. Its locomotives were of the most modern design, improvements were being made to roadbed and wayside structures, and it even leased engines to the P&T RR. Back in 1833 the road had hauled less than 110,000 passengers. In 1840 upward of 175,000 were carried. Two through trains, the *Morning Line* and the *Mail Pilot Line*, ran each way on week days between Jersey City and Philadelphia. Later this was increased to six daily trains.

In 1848 mail and express service was effected. Commutation tickets between Jersey City and Philadelphia made their appearance in 1850 and special cars for ladies were added to all through trains in 1854. A highlight of 1858 was the installation of gas lights in the passenger coaches. This must have been a welcome innovation to the night traveler, as the old sperm candles never failed to go out whenever the doors of the coaches were opened while the train was in motion. It is interesting to note the fares of this period. First class rates between Jersey City and Philadelphia were $3 via Amboy and $4 via Trenton and the P&T RR.

When railroad service was first started the intention was to carry passengers and let the freight traffic go to the canal. Shippers, however, were demanding faster service and gradually the railroad took over more of the freight hauling. In 1859 the NJ RR. double-tracked its line from Jersey City to New Brunswick to take care of the increase in traffic. By 1860 the C&A frequently added as many as three extra trains in a single day.

The great struggle between the North and the South added a heavy burden to the rail transportation system. One-third of the line between Camden and Amboy was double-tracked and it became necessary to enlarge upon the facilities between Trenton and New Brunswick. The line paralleled the D&R Canal from Trenton to Kingston and from that point turned eastward toward New Brunswick. This route was thought to be too crooked for new double tracking and a new location was selected between Trenton and Dean's Pond (Monmouth Junction). This was built with two tracks and an additional track was placed beside the old line from Deans to New Bruns-

wick. Princeton was by-passed, and so the short branch to that town came into existence. The double tracking, including the P&T lines to Philadelphia, was completed in 1864.

In 1867 an agreement was reached between the NJ RR., C&A, and the Delaware & Raritan Canal Company in regard to service improvements between the Hudson River and Philadelphia, and by 1869 express trains rolled (and rocked) between Jersey City and the City of Brotherly Love in the short space of four hours' time.

THE Pennsylvania Railroad, chartered in Pennsylvania in 1846, had for a long time looked with envious eyes on the great terminal facilities at Jersey City and South Amboy. It had planned on leasing the Central Railroad of New Jersey to gain access to the metropolitan area, and had exchanged service with that road together with the Philadelphia & Reading via Harrisburg-Allentown and Jersey City.

Early in 1870 negotiations were opened for leasing the properties of the United Companies, and the final agreement, which took effect July 1, 1871, covered the following railroad and canal companies: under the United Canal & Railroad Companies of New Jersey, the Camden & Amboy Railroad from Camden to the Raritan Bay, and the New Jersey Railroad & Transportation Company from Jersey City to New Brunswick; and under the Joint Companies, the C&A, New Jersey Railroad and the Delaware & Raritan Canal, the railroad extending from New Brunswick to Trenton and Bordentown, and the canal connecting the Delaware and Raritan Rivers. The lease was to run for 999 years and involved 145 miles of railroad and 66 miles of canals. The P&T RR. was also a party to this lease, as was the Connecting Railroad from Frankford Junction to West Philadelphia on the Pennsylvania. The lease also covered ferry lines at Jersey City and Camden, and the following railroad lines which are not a part of the present New York Division: the Burlington County Railroad, the Pemberton & Hightstown, the Vincentown Branch of the Burlington County Railroad, the Mount Holly, the Lumberton & Medford, the Frankford & Holmesburg, and the West Jersey Railroad.

The United Companies were merged as the United New Jersey Railroad & Canal Company in 1872, and this company maintains offices in the city of Trenton today.

From the very day of its acquisition, the Pennsylvania maintained a steady pace of improvements on the lines in New Jersey. In 1874 a new passenger station was built in Jersey City and freight facilities were extended and improved at Harsimus Cove in that city. Through passenger service was inaugurated to New England in 1876, and in 1885 the railroad placed parlor cars of its own in service on New York-Washington trains. Two years later the New Jersey Junction Railroad was completed, connecting the New York Division, Harsimus Cove and the West Shore Railroad, after which trains of the West Shore regularly used the Jersey City Depot.

Additional ferry service from Jersey City to uptown Manhattan was established in 1897 and other ferry service in the New York Harbor was purchased. The following year the Jersey City station was destroyed by fire and the present structure was erected and placed in service in 1899.

A CONTROLLING interest in the capital stock of the Long Island Railroad was purchased in 1900 and proved the birth of what is probably the crowning achievement of the railroad in the East. The Pennsylvania contemplated use of a portion of the Long Island, together with a newly constructed line to be known as the New York Connecting Railroad, to form a physical connection with the New Haven, which would use a direct route

Color light signals.

There's more than a surface difference between the searchlight signal with one lens and the color light signal with a separate lens for each color. Parabolic reflectors cannot be used in the color light signal because reflections of outside light might cause false indications. But in the searchlight signal, which interposes a disc of the desired color for each indication, a reflector can safely be used, and so the indication is much stronger.

through New York City by means of tunnel or bridge construction.

Numerous studies were made as to the most feasible method of gaining access to the city of New York. A station was to be constructed in the heart of the city and the final conclusions called for a high-level bridge across the Hudson River. As the cost of such a structure would exceed a hundred million dollars, the Pennsylvania attempted to interest the other railroads which terminated on the Hudson. The project failed to receive the necessary cooperation from the various roads and the Pennsylvania therefore decided upon a tunnel design for its exclusive use.

In 1902 the Pennsylvania, New Jersey & New York Railroad Company and the Pennsylvania, New York & Long Island Railroad Company were chartered to carry out this work. In 1906 the tunnels were in place between Weehawken and New York and on September 8, 1910, the first train passed through the East River tunnels connecting the island of Manhattan and Long Island. The two aforementioned companies were merged as the present Pennsylvania Tunnel & Terminal Company on June 26, 1907.

On November 27, 1910, the first train entered the station from the west and the entire project extending from Harrison (Manhattan Transfer) to Sunnyside was opened to traffic. The Pennsylvania Railroad at last realized a dream of more than 40 years.

Since 1910 many other projects have been successfully completed, including station modernization at Trenton, grade crossing eliminations, heavy rail-laying program and other roadside improvements, the great electrification, and the new signal system as noted heretofore.

And what of the old canal? As late as 1889 it was a profitable enterprise and carried about 1,200,000 tons of freight in that year. In fact, considerable traffic was in evidence during World War I, but thereafter mostly pleasure craft plied its placid waters. Operations were completely discontinued in 1933 and today it lies in serene solitude, visited only by barefoot boys searching for fish, or an occasional history-loving tourist. Portions of the ditch have been filled in, locks and lock tenders' buildings are rotting—but all that is another story.

We have looked in on a section of railroad that operates with an enviable smoothness and regularity a fleet of the finest and fastest pasenger trains in the world, a freight service with schedules comparable to that of many passenger runs, one unit of the many divisions that are a part of the "Standard Railroad of the World," a division that is of vital importance to the communities which it serves, a line that has great significance in our national defense scheme and which will have even greater significance now that the country is actually at war.

No seasoned traveler should be content to settle down by his fireside until he has enjoyed the services which this line offers. Surely no ardent railfan can rest in peace until he has viewed its wonders.

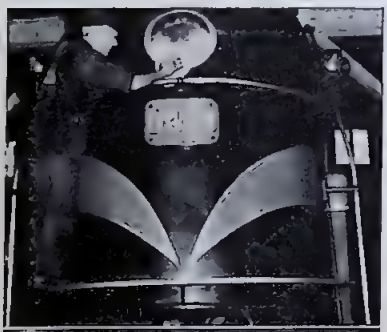
The world's busiest stretch of railroad is the pride of the Pennsylvania System and a joy to travelers and railfans alike. Remember, it offers the greatest railroad show on earth, twice daily, rain or shine.

Switcher.

The 28 Class B-1 electric six-wheel switching locomotives of the Pennsylvania are on a practically 24-hour shift. The external similarity to a steam switcher is apparent, all weight being on drivers. Starting tractive effort is 39,500 pounds, about the same as most 0-6-0 steam switchers, and maximum speed is 25 miles per hour.

Washing Locomotives

★ Dirt and grease removed by hot water and oil.



EVEN a black, dirty-looking locomotive needs a good bath now and then. The fact is, most locomotives get a complete washing up every time they come into the engine terminal from a run.

It takes boiling hot water mixed with fuel oil to do the trick. Incoming locomotives stop at a washup stand on the way to the roundhouse. This stand is simply board platforms on each side of the track, with connections for hot water under pressure of about 150 pounds per square inch, and for the fuel oil which is mixed in very sparingly, about one quart for every 200 gallons of water.

The process consists mostly of adroit use of long-handled nozzles by the washup crew. The water and oil mixture is shot into all the corners and crannies of the running gear until every bit of road dirt and grease slides off onto the soggy, oily, dirty ground. The oil not only helps to cut grease, but prevents rusting of unpainted steel parts.

More or less wiping up and polishing follows, depending on the road and whether the engine is for passenger or freight service. The old days of ceaseless brass polishing are gone, but bright enamels and chromium plate on some new streamlined locomotives necessitate attention.

The lower photo to the left shows a Canadian National boilermaker on the job of washing down the crown sheet, or firebox roof, to remove boiler scale and mud. This internal cleansing need be done only once a month, but is extremely important in saving fuel. The photo on the opposite page shows a new development in locomotive washing: standpipes with nozzles between which the locomotive is slowly driven.

All photographs courtesy Canadian National.

David Moffat's Dreams Came True

★ The fiercest blizzards, the highest mountain pass, the longest tunnel: These things were conquered.

By Forest Crossen.

PROUD excitement gripped the new railroad hamlet of Bond on the western slope of the Colorado Rockies. Hundreds of people, gathered around the new station, section house and water tanks glistening with fresh paint, waited impatiently. It was early afternoon of June 16, 1934.

The hands of the station clock swung to 1:30. A canvas-gloved hand opened a throttle a few notches. Steam hissed from cylinder cocks, and a soft exhaust came from the short stack as the skilled engineer took up the slack in the crack passenger train carrying high railroad officials and important guests. Then the exhaust echoed from the nearby cliffs in a song of triumph. The long, sleek locomotive moved out smartly with its all-Pullman train, the finest rolling stock of the Denver & Rio Grande Western Railroad.

A roaring cheer swelled from the crowd as the new Burlington *Zephyr* flashed by, a streak of silver in the sunlight. Then a throb of power, the tearing exhausts of the most powerful freight locomotive of the Rio Grande, a mighty 3600. It thundered by, the engineer flashing a smile at the crowd. Then all three trains were gone.

They had moved out to officially open the long-awaited Dotsero Cutoff connecting the Denver & Salt Lake Railway with the Denver & Rio Grande Western, a link of 38 miles that made possible the utilization of one of man's triumphs, the Moffat Tunnel, to put Denver on a direct transcontinental route. Back of the Dotsero Cutoff opening was three-quarters of a century of struggle against the towering snow-covered Continental Divide, with David Moffat the leading marshal.

WHEN the first Colorado gold hunters settled at the junction of the Platte River and Cherry Creek (now Denver) there was talk of better transportation from the "States." Set down in a hostile country 600 miles from the nearest settlement, they saw the need for a railroad.

The first governor, William Gilpin, dreamed of a railroad uniting the "States" and California, via Denver City. He flung his influence into the struggle to have the government build it. Following him came John Evans, who likewise did all within his power to bring the rails through the tiny but growing frontier town. Surveys were made to find a feasible crossing place over the 300 miles of high mountain backbone, the "Range," which loomed, always snow-mantled, against the Western sky.

In the midst of these discussions, quietly, almost unobserved, there arrived in Denver City, to open a book and stationery store, a tall, thin young man of 20 with a stock of goods and an engaging open smile that drew men to him. His name was David H. Moffat.

He had been a millionaire—on paper—in Omaha but a short time before, prior to the bursting of a real estate boom. He had grown up in a banking house in New York State, served as teller in a Des Moines bank and as cashier of a bank in Omaha. But the West, with its glowing frontier, had lured him. One of the first sights to greet him over the huddle of log huts was that of the tremendous mountains that eventually called him to combat to the death.

Young Moffat prospered, and he attracted men with that limitless gift for friendship, integrity and warm kindness that will never be forgotten as long as men remember the West. In 1867 he became cashier of the First National Bank of Denver.

The fire of railroading was in his blood. He was a leading figure in every meeting called to discuss the railroad question. The Union Pacific, hurrying westward to span the continent after the Civil War, would pass 106 miles to the north. The citizens were indignant. Yet all understood the reason—the terrible heights of the Continental Divide, over which

L. C. McClure, courtesy Denver & Salt Lake Railroad.

His life work, a transcontinental railroad west from Denver.

David Moffat went to Colorado a young man, ambitious to wrest a fortune from the wilderness and return East. He stayed, after winning his fortune, to spend it, and by his consistent drive and foresight to finally place Denver on a through transcontinental railroad burrowing the high wall of the Divide which seemingly rises over the west ends of Denver streets. But David Moffat did not live to see the completion of his dream.

the storm gods eternally brooded. The Union Pacific crossed the Divide at a low pass in Wyoming.

But Denver must have a railroad. The Kansas Pacific was building westward to it. A company was formed to construct a connecting link, the Denver Pacific, to the Union Pacific at Cheyenne. David H. Moffat was the guiding genius, and the first engine to steam into Denver from the north bore his name. But still Denver was not on a main line.

Moffat rose in power, attracting friends by his shining honesty and warm generosity. He had planned to make $75,000 and return to

New York with his young wife, but he fell under the new country's spell and remained forever smitten. His first mining venture was the Caribou Mine near Boulder, a famous silver producer that brought him wealth.

When the rich silver carbonate blanket-ore veins of Leadville were discovered, Moffat was a pioneer in the field. He bought an interest in the famous Little Pittsburg Mine that raised H. A. W. Tabor from a ragged storekeeper to a colorful Croesus. Moffat took millions from the Little Pittsburg, the Maid of Erin and the Robert E. Lee.

He pushed the first narrow gauge railroad to the Cloud City—the Denver, South Park & Pacific.

He was at Aspen when that rich silver camp opened, controlling some of the best mines.

When Creede blasted into life with her amazing silver mines, Moffat was part owner of the best properties; he and his associates

Collection of Joseph Schick, Keenesburg, Colo.

Looking up. High on the rocky bluffs 700 feet above Yankee Doodle Lake is this train on the old Moffat Road. The location is below the letter *o* in the word *Boulder* on the map, opposite page. Many old car wheels can be found in the debris near the camera, remnants of past mishaps at this dangerous spot on the old line.

And looking down. From the winding tracks of the old route across the top of the world the traveler got many a view of curving tracks far below, such as this (bottom) of the loop around Yankee Doodle Lake as seen from the point where the train is passing in the above picture. The lake is completely obliterated under yards of snow, the track is a dark cut, and the snow shed at the right is well covered at its center. It was the snow through nine months of the year that more than anything else made a tunnel necessary if this route were to be a part of any through railroad.

Collection of Forest Crossen, 2002 Spruce St., Boulder, Colo.

Joseph Schick collection.

had grubstaked Jim Creede, the discoverer. Moffat himself built a connecting link from the Denver & Rio Grande Western main line at Wagon Wheel Gap to Creede. The big railroad, of which he was president, refused to take the chance.

When Cripple Creek bared her rich gold veins, Moffat was there. He dared to build the Florence & Cripple Creek Railroad [see December TRAINS, page 4] when men doubted the riches of what was to prove to be one of the best gold-producing districts in the entire world.

And through it all he remained the frontier banker—a type unhappily lost to us—kindly, understanding, helping men to regain their feet after misfortune. He was a part of that lost West where men helped each other in one of the great periods of all time. He saw his destiny clearly.

In the back of his mind was the dream of putting Denver on a transcontinental route, at

How to save 22 miles. The above map geographically shows how the Moffat Tunnel cut the mileage of the Denver & Salt Lake across the Divide. To climb to the highest elevation of any American standard gauge railroad plenty of track was needed even to keep the grade within a steep 4 per cent. Sixteen-degree curves, miles of snow sheds, natural snow-collecting bowls like that around Yankee Doodle Lake, all added to the normal high cost of operating up heavy grades. This was the road of strong men and stronger engines. Helper engines and rotary snowplows alike sometimes were not enough. Corona, on top of it all, was sometimes completely buried beneath snow. But now passengers ride through the tunnel luxuriously and safely in air-conditioned comfort.

L. C. McClure, 2123 Glenarm Pl., Denver, Colo.

Both photographs, L. C. McClure.

the same time opening the riches of western Colorado to man. At the age of 63, when his fortune stood at nine million dollars, he boldly started pushing a railroad through to Salt Lake City.

It struggled up rugged South Boulder Canyon, through tunnel after tunnel, until it reached the foot of a mountain leading to the Continental Divide. Up this it pushed, with four per cent grades and sharp curves. It crossed the treeless, wind-whipped backbone of a mighty land at an altitude of 11,660 feet, the highest standard gauge crossing in North America.

Moffat's resources were not equal to building the long tunnel that he knew was necessary. It would have to come later, when the railroad had earned enough money.

Litigations, delays, refusal of promised financial backing and costly battling with stubborn granite took toll of Moffat's fortune. His millions melted like snow in a Chinook wind. When the road was 200 miles west of Denver, far short of its goal, Moffat's entire fortune was gone.

He had dared to stand out against the cruel, relentless "Range" in single combat, and he died with his last few dollars in his hands, still fighting.

Other brave men of vision carried on. The railroad up over the dizzy heights was operated at an appalling expense. Forty-one per cent of the cost of operation went to fight snow. Rotary snowplows worked night and day, the terrific winds filling the cleared paths almost as soon as the plows had passed. Men lost lives and limbs in awful accidents. But still the railroad operated, sometimes not for months due to snow blockades on the heights, and at an annual deficit.

Men looked hungrily across the mountains at the rich coal, timber, oil, grazing lands and black farming soil. To utilize these riches there must be a tunnel through which trains could operate cheaply and swiftly. Also, Denver was to be placed on a direct transconti-

The D&SL climbs the escarpment of the Rockies.

Not timidly, up some smoothly undulating river valley, but boldly up the very face of the rocky bluffs themselves does the Denver & Salt Lake scale the Rockies west of Denver. Ride the *Exposition Flyer* west some morning. The start from Denver seems almost level, but the locomotive exhaust betrays the urgency of the fight to gain elevation. Soon small foothills grow into unmistakable mountains, and you are rounding the edge toward Tunnel No. 1 looking out over the Great Plains. Through other tunnels the train works its way, always upward, and at No. 6 (left) is still on the very edge of the mountains. A glance from the car window (below) shows geography in the raw. Far below in the foothills (right) and farther up, almost in the foreground, winds an abandoned railroad grade, typical of Colorado. This one probably never saw iron, and it may have been Moffat's earlier project to build an interurban line over Rollins Pass.

nental route. The Moffat tradition was held high.

Year after year went by with only the dream. Private capital could not be interested. Then, on May 12, 1922, Governor Oliver H. Shoup signed the bill that both houses of leg-

islature had passed authorizing the boring of a tunnel under James Peak at public expense. The name of Moffat was affixed to the project.

Men threw back their shoulders, began to see the dream as a shining reality. Work was begun late in 1923.

The tunnel was bored from both ends. The men on the eastern slope drilled into solid granite, first constructing a smaller tunnel from which to work on the main railroad bore, thus speeding the construction. Approximately 300 men were employed.

They had little timbering to do, but water was always a problem. Once they struck a six-foot seam of water that flowed 1800 gallons a minute, flooding the workings. Engineers found that a beautiful little glacial lake high above was draining into the tunnel through a fissure. Later, a terrific flow, estimated at 3100 gallons a minute, nearly cost workers their lives. But the work went on.

On the west side 500 men battled soft ground from the first. The toughest Oregon fir timbers, one foot square, set upright, cracked under the mountain's enormous weight. Men labored under a ceiling that might give way and in an instant crush out their lives.

One ghastly cave-in did occur. A timbering crew of six men was crushed to a pulp under tons of rock. Yet the work went on.

Finally came the day when men working in the smaller tunnel could hear blasting from the opposite side. Excitement reigned, men working at a feverish pace. There was great rivalry as to which crew, east or west, should drive the first hole through the barrier.

A ceremony was arranged for the "holing through," with careful President Coolidge to press a telegraph key in Washington which would set off charges of dynamite to blast down the last barrier between the entrances. Radio engineers set up apparatus to carry the blasts to the world.

But it is difficult to control hard-rock min-

Forest Orossen.

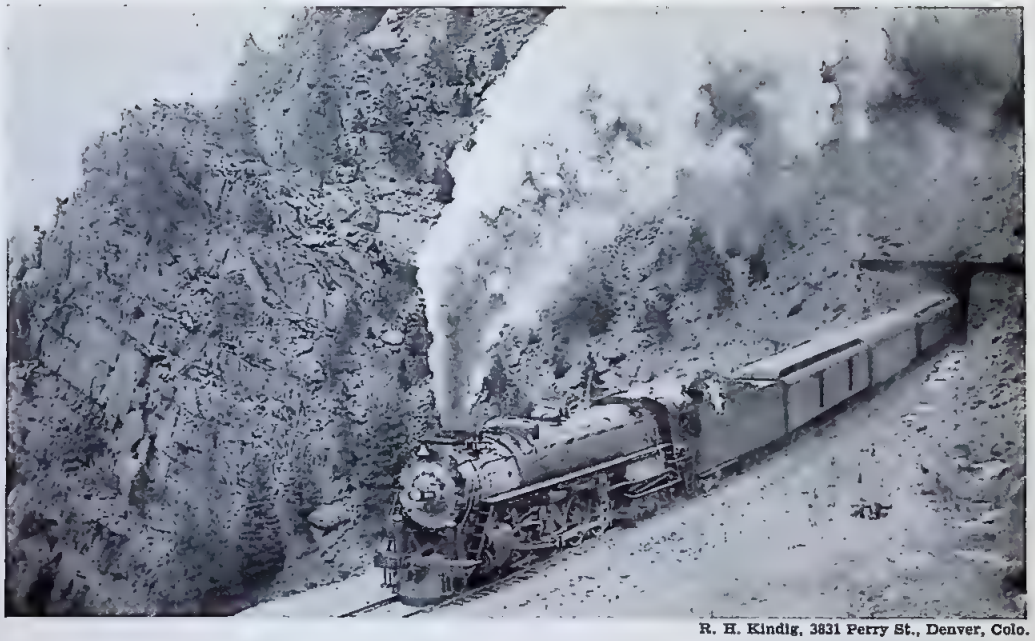
Once a snow shed.

At 11,660 feet above sea level a railroad must literally operate under cover. This pile of kindling wood was once a snow shed near Corona. Blizzards strike here almost any time of year.

L. O. McClure.

East Portal.

Right where David Moffat planned it years ago, the tunnel which bears his name holes into James Peak and disappears into the interior of the very rockiest of Rockies. The roadbed in the foreground is the old line curving around to start its circuitous climb over Rollins Pass. The building is the ventilating plant which can keep the air in the tunnel clear in spite of freight locomotive exhaust. Air starts to move through the entire 6.25-mile bore almost as soon as the 500-horsepower fan motors are turned on. Electrification would have been too expensive due to a poor load factor.



R. H. Kindig, 3831 Perry St., Denver, Colo.

A world's fair started this.

Moffat Tunnel was finished in 1928. The Dotsero Cutoff, connecting it with through D&RGW tracks to Salt Lake City, was finished in 1934. Yet such is the expense, and in these times the risk, of starting a new transcontinental train, that it took the San Francisco Golden Gate Exposition of 1939 to inspire the first passenger train (*Exposition Flyer*, above at tunnel No. 8) from Chicago to the West Coast routed this way.

ers. The crew of both sides wanted the honor of being the first through. Only 20 feet of soft rock separated them on the night of February 12, 1927. Light charges of dynamite were used to avoid dangers of a cave-in.

Before the west side crew went off shift, its superintendent took a long bar of tough steel and told his men to try to ram it through the barrier. All attempts to drill through had failed. The men dashed the bar against the stubborn face of the rock. It went through!

The east side crew saw the projecting piece of steel and seized it, knowing that the honor would be theirs if they could wrest it from the opposing crew. But the superintendent had foreseen this possible move and had had a blacksmith bend the bar so that it could not be pulled through the small hole. In the dark and damp bowels of the mountain men seesawed the bar of steel back and forth, heedless of bleeding hands.

The ceremony came off six days later.

When the first locomotive steamed through the completed 6¼-mile tunnel, on February 26, 1928, another epoch in man's progress was achieved. Into it had gone sweat and blood and the throbbing of weary brains. Into it had gone 18 million dollars pledged by the people of Colorado.

Still Denver was not on a direct transcontinental line. The Denver & Salt Lake—Moffat—alone used the tunnel. It is a short line, reaching to Craig, Colo., 240 miles from Denver.

The final link was the Dotsero Cutoff, begun in the autumn of 1932, after an agreement had been reached by the Denver & Rio Grande Western with the Moffat for joint use of track and tunnel. The grade line followed the turbulent Colorado River, the unruly stream at times making the work hazardous. Onward the last 38-mile connection in the great dream was pushed.

The rails were spiked into place, the celebration arranged. Radio gave the tearing exhausts of locomotives and cheers of a happy throng to the world.

The importance of the Dotsero Cutoff is great. It places Denver on a direct transcontinental route. It clips 175 miles from the dis-

The reliable trains.

Channing Pollock, the noted author, playwright and lecturer, recently wrote: "At the conclusion of my fifteenth consecutive year as a lecturer I am moved to write of a remarkable record for which the railroads are responsible. Traveling entirely by rail, I have delivered more than 2000 lectures, each in a different place, without missing or being late for one. During this time I have 'pinch hit' for at least two dozen other men who had taken the chance of journeying by motor car, motor bus, or airplane. In addition, I should hesitate to put a value on the work I have done in railway trains that could not possibly have been accomplished in any other conveyance."

tance between Denver and Salt Lake City via D&RGW, and it eliminates 7359 feet of climbing that the Royal Gorge line of the Rio Grande is forced to make. It means a saving of more than 50 per cent in overcoming grade resistance.

It is a thrill to stand at the east portal of the Moffat Tunnel and see the headlight of a locomotive gleam in the smoke-blackened bore like a tiny candle flame, 2½ miles back in the bowels of the mountain. Nearer and nearer it comes, growing larger and brighter. Finally the locomotive and train slide from the tunnel into the clean light of day.

If it is a passenger train, there will be little smoke, for firemen enter with fire well burned down. But freights enter with black smoke belching from short stacks equipped with hoods that shoot it backward; their engines must maintain a full head of steam to pull over the slight apex.

The ventilating plant is started as soon as the caboose or last coach enters the tunnel. A heavy canvas curtain drops, completey shutting off the air behind the train. Then the powerful fans begin to whirl, sucking the smoke back from a westbound train or blowing it back from an eastbound. Black smoke pours from the outlets of the ventilating plant towers like a three-alarm fire.

The Moffat Tunnel route connects the Burlington and Missouri Pacific via Denver & Rio Grande Western with the Western Pacific, thus forming an efficient transcontinental railroad system to challenge the Union Pacific to the north. The direct coast-to-coast route for Denver is realized.

The distance from Chicago to Salt Lake City via the Burlington and the Moffat Tunnel route is 1587 miles, or only 72 miles more than the rail haul over the North Western and Union Pacific. But because the Western Pacific has a longer route to the coast than has the Southern Pacific, the total length of the Burlington-Moffat-Western Pacific transcontinental route from Chicago to San Francisco is 2515 miles, 257 miles longer than the Overland Route.

On the other hand, the Western Pacific, which was built much later than the Southern Pacific, has more favorable grades. Its line up the Feather River Canyon has a ruling grade of 1 per cent, and in fact this stretch involves one of the longest continuous 1 per cent grades in the world. Southern Pacific has grades of as much as 2 per cent in its crossing of the Sierras. In the Rocky Mountain crossing the advantage remains with the Overland Route, as the maximum grade up Sherman Hill on the Union Pacific is 1.65 per cent, and the Denver & Rio Grande Western has 2.4 per cent grade against westbound trains over the Wasatch Range near the Salt Lake City end.

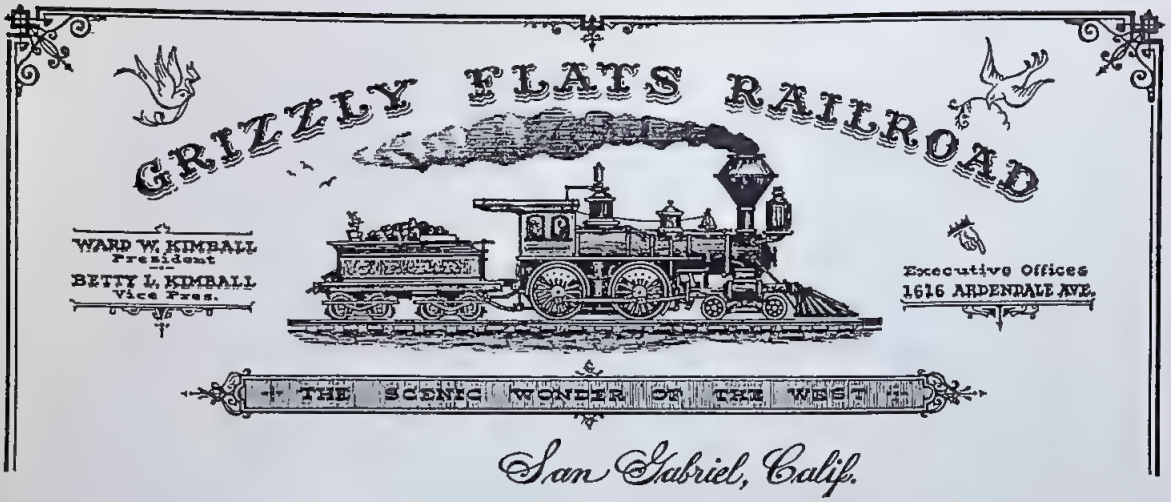
Many a new railroad route in recent years has been used for freight service only, but the scenic possibilities of the Moffat, which had been exploited to the full by the Denver & Salt Lake in its purely local business, were not lost sight of by the D&RGW. Denver-Salt Lake service was instituted with the *Panoramic*, but it was not until 1939 that a through transcontinental train was put on the line, a joint Burlington-Rio Grande-Western Pacific proposition. This is the *Exposition Flyer*, a train which has been scheduled to pass through the best scenic attractions by day.

Men say the spirit of David Moffat hovers over the portals of the tunnel as powerful freight locomotives draw long trains through and as fast passenger trains flash from one vista of sun-flooded mountain beauty to another.

Courtesy Mr. Tulga, Gertrude M. Thress and the Norfolk & Western Magazine.

Early locomotive of Detroit, Toledo & Ironton.

The little Iron Railroad ran 13 miles from Ironton, on the Ohio River, to Center Station when in 1863 it bought this freight locomotive from the Baldwin Locomotive Works. The engine was shipped from Philadelphia to Pittsburgh on a flat car because of its odd 4'-10" gauge, and was then floated down the Ohio on a barge. It weighed 22½ tons, carried 120 pounds of steam, and had no injectors or lubricators. By 1869 it was one of three Iron Railroad locomotives hauling 664,541 ton-miles of freight and 234,368 passenger-miles to earn the little line a net profit of some $7500. In the first years of the present century the Iron Railroad became a part of the present Detroit, Toledo & Ironton, and this sector is still operated, but for freight service only. The locomotive is a Baldwin flexible-beam engine, and the running gear gives the appearance of having been built about 1845 or 1850, while the domes and cab look later. It seems likely, therefore, that the engine was purchased factory-rebuilt rather than new.



★ The tale of the little engine that lived a long life on the Nevada Central, went to Heaven on the Ward Kimball estate, and was forever immortalized by Walt Disney.

I.

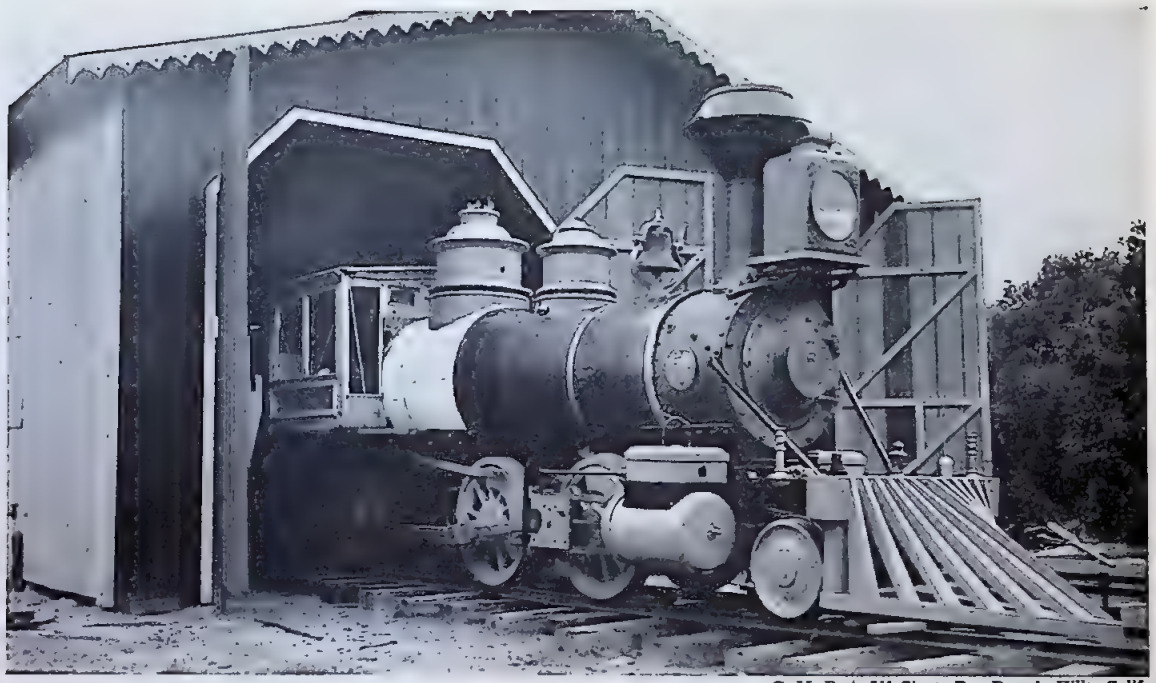
HER name was *Sidney*—that is, if a she locomotive can have a he name—*Sidney Dillon* for long, and she was named after the president of the Union Pacific because the Union Pacific bought her, brand new, and placed her on the narrow, crooked rails of the Nevada Central.

Ordinarily a large railroad like the Union Pacific wouldn't monkey with a little pike such as the unprofitable Nevada Central, but in order to get its traffic over the Central Pacific to California, UP had to deal with the famous "Big Four": Leland Stanford, Mark Hopkins, Charles Crocker, and C. P. Huntington. The UP didn't like some aspects of its predicament and made arrangements in 1881 to build its own line, the Salt Lake & Western, across Nevada to California. The Nevada Central was purchased with the idea of mak-

First run

Posed here for a picture is *Sidney Dillon* at Battle Mountain, Nev., ready for its first run to Austin in 1881. This engine and one other were purchased for the Nevada Central by the Union Pacific, since the latter then intended to build its own line across Nevada a few miles south of Austin. At top of page is a reproduction of Ward Kimball's letterhead.

Ward Kimball collection.



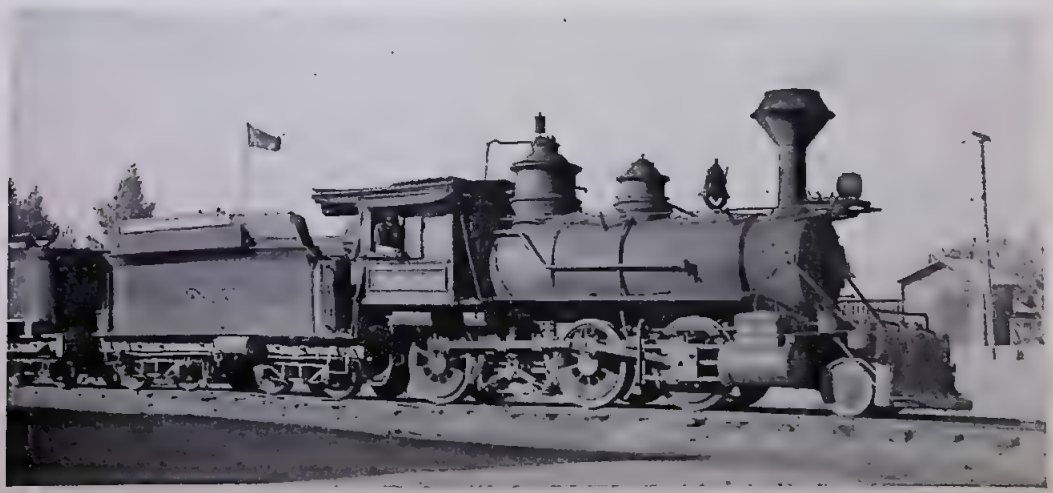
G. M. Best, 511 Sierra Dr., Beverly Hills, Calif.

New home The restored *Sidney Dillon*, now the *Emma Nevada* of Ward Kimball's Grizzly Flats Railroad, has its own special engine house and 500 feet of track. While much work has been done to lift her face, the job is still far from finished.

ing it a future feeder to the projected (and never built) UP main line.

Sidney Dillon, alias engine No. 2, and her twin, *S. H. H. Clark*, were the only two *new* locomotives the Nevada Central ever had. They were of the Mogul type, weighed 22 tons, had 13" x 18" cylinders, 41" drivers, three-foot gauge, a wheel base of 17'-10", rigid wheel base of 12 feet, and ran on 100 pounds of steam. Their run was up and down the 92-mile line in Reese River Valley, a road that cost everything and made hardly any-

Last run Without much ceremony the No. 2, no longer bearing the name *Sidney Dillon*, makes its way to Battle Mountain pulling other remnants of the old Nevada Central. Three-foot gauge railroads were once expected to net the nation, rivaling the standard gauge systems, but the dream lost its spark after the first boom. There is none operating in Nevada today.



Richard B. Jackson, 619 Alpine Dr., Beverly Hills, Calif.

Upon arrival at the SP shops in Los Angeles, Kimball's locomotive was fired up to see if it would still perk. It perked. This is the first of a fine series of photographs being made by Gerry Best, well known railroad photographer, telling the story of the Grizzly Flats. Above, shortly after arrival at

thing. It was even boasted that one of the advantages of railroads in the desert country was the lack of trees; being absent, they couldn't fall across the tracks.

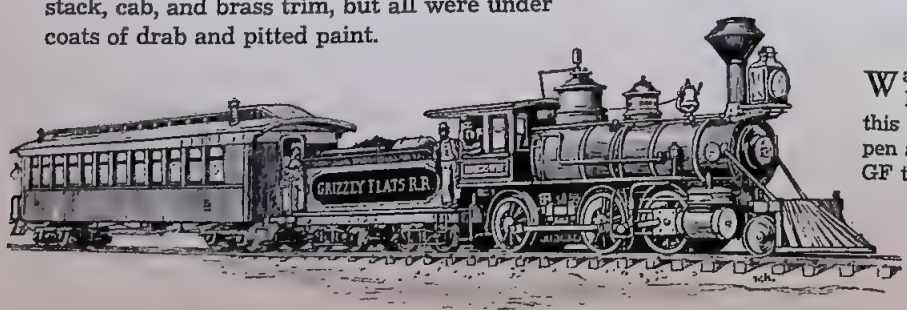
The Nevada Central was completed in 1880. At the southern terminous was Austin, busy mining town; Battle Mountain, a station on the Central Pacific, was at the north. At first there were three trains a day, but that was expensive without passengers or lading. Very soon trains were taken off the schedule, leaving a once-a-day service each way. Later, about the time of World War I, steam locomotives worked only on rare occasions when business was exceptional; the remaining service was by a motor car running on the rails. In 1934 the line showed a small but not encouraging profit. Austin had a population of 600; the nearly 100 miles between Austin and Battle Mountain was reputed to have a population of 1.

Naturally the Nevada Central was abandoned except for the privilege of running busses and trucks, and in 1938, No. 2, its name no longer used, made its last run, tired but not worn out. It still had the original domes, stack, cab, and brass trim, but all were under coats of drab and pitted paint.

II.

Sidney Dillon was forgotten. She stood idly in a shed in Battle Mountain, wheel treads slightly rusted. Near her were two older locomotives, one that started its life on the North Pacific Coast Railway in the mountains north of San Francisco, the other an engine that once worked on the Utah & Northern. *S. H. H. Clark* was not there; she had been scrapped.

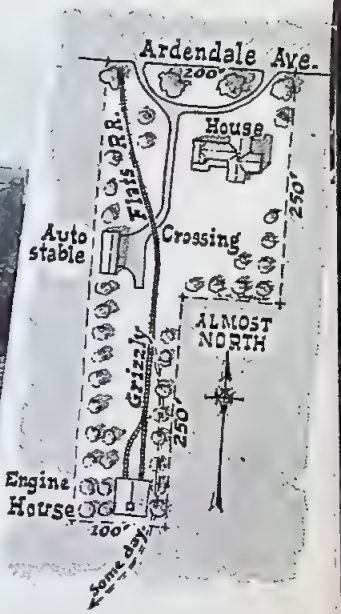
Gilbert H. Kneiss, author of an excellent book (see page 49) about the bonanza railroads, wandered into Battle Mountain about that time, was intrigued by the three quiet old-timers, and was eventually in great part responsible for their preservation. Two of the locomotives found their way to the San Francisco World's Fair to take part in the golden spike scene of *Cavalcade*. They belong to the Railway and Locomotive Historical Society. No. 2, our *Sidney Dillon*, was loaded into a gondola car and hauled down to the Los Angeles shops of the Southern Pacific, the proud possession of Ward Kimball, who always wanted a railroad of his own. Upon a



Ward Kimball's agile hand turned out this authentic "old" pen and ink cut of the GF train.

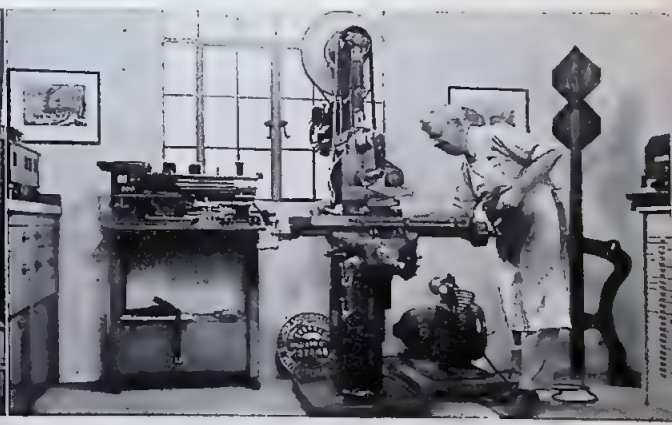
G. M. Best.

new home, first steps were to inspect and dismantle worn-out parts and replace items not in keeping with the original 1881 version. The picture reproduced on page 38 was used as a guide for the authenticity of the work.



Linn H. Westcott.

Kimball and Master Mechanic Bill Cooper at work on the new cow catcher and pilot beam. July, 1940.



G. M. Best.

R. B. Jackson makes missing parts by copying authentic items from his own fine collection.

Ward and Betty Kimball install the fourth brass band over renewed lagging and jacket. The Kimballs' two children are too young to appreciate this.

G. M. Best.

Ready to go down the 500-foot main line. Backheads of old-time engines were much simpler than those of today; cabs were small and cozy too.

G. M. Best.

While the locomotive is under its rebuilding program, the track and structures crew prepares the right of way. The Kimballs give tracklaying barbecues for their friends; everybody helps and everybody eats. The first important extension is the switch and track arrangement for the new engine house. Orange trees are uprooted, the ground is leveled and ties placed ready for the rail. Much of the rail used is authentic 35-pound narrow gauge material from abandoned lines such as the Carson & Colorado. Top hat I. A. Crawford helps boss—that is, until . . . better not tell about that. What's this? A grade crossing dispute between homegoing track crew and Kimball's latest model 1913 phaeton, another treasured item in the collection. With all the crew on hand, the first framing of the new engine house is

flat car on the same train rode No. 5, old open-end coach from the Carson & Colorado Railroad.

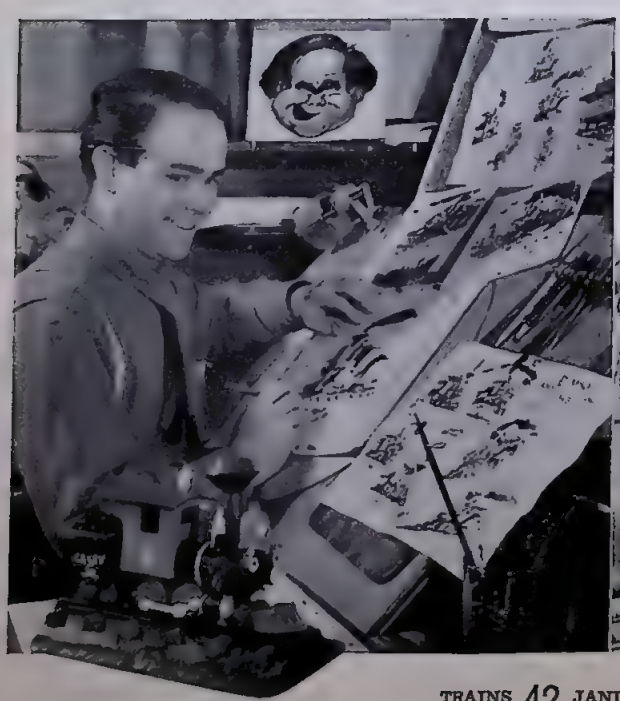
Meanwhile a busy group of railroad-minded men, otherwise of quite prosaic occupations, were wielding picks and shovels, driving spikes and bolting fishplates to make a short length of three-foot gauge track on Kimball's estate in San Gabriel.

Thus was formed the Grizzly Flats Railroad, and when the locomotive came it was rechristened the *Emma Nevada* in honor of the prima donna who had made Austin famous as her home in the days when opera houses were found in every city and town of the country.

Emma was brought through the orange groves by truck and placed upon the 35-pound rails. She was no sight for sore eyes, however, just a muddy-gray piece of machinery with a dinky little headlight much too small for the platform that once carried an ornate man-sized wick lamp with intricate striping on its sides.

With the invaluable help of many friends, especially R. B. Jackson and Bill Cooper, the locomotive was renovated piece by piece, using as a guide the only available photograph of the engine as it was originally built.

The pilot was built completely in the Kimball garage. The next step was the painting of tender and coach. Lagging was removed and



Disney wanted an engine.

So Ward Kimball patterned it after the *Emma Nevada*, but of course with changes. (*Emma* would be too dignified to go through all that *Casey Jr.* has to do.) The model is used and turned in all directions to get perspective angles for drawings. Below: *Casey*, too busy for antics now.

G. M. Best.

erected. The design of this building is composite but nevertheless authentic style for the age it represents. The shop is complete with overhead cupola and ventilator, weather vane, and—more important—a pit for repairing the locomotive when necessary. The coach occupies the right hand stall. Notice similarities in the Disney version, page 44. After a day's work the gang assembles for a good old-time picture: Gerry Best is under the focusing cloth, I. A. Crawford above, and (left to right) Bob Crawford, Betty Kimball, Tom Crawford (on the ground), Bill Cooper, and Art Rudd. Brass Hat Ward Kimball looks on from the valve chest. A future branch will pass just beyond the camera tripod if the plans of the railroad can be carried out satisfactorily. The branch will make the railroad nearly 1000 feet long.

the brass bands, coated with years of paint, were once more polished and carefully placed in their original positions. Much work is yet to be done on the *Emma Nevada* before she regains the splendor of her days as *Sidney Dillon*, but already her original form and color are quite apparent.

Out on the "main" the 250 feet of track was extended to 500. A sparkling old-style two-stall engine house was built, complete with gingerbread and a weather vane that looks just like *Emma*. The building is equipped with a pit so repairs can be made easily. Ward's tracklaying, locomotive-polishing barbecues are now quite an establishment, everybody has fun, and the Grizzly Flats Railroad gets work done without union trouble, or even an investigation by the Interstate Commerce Commission.

In real life Ward Kimball, not yet in his thirties, is one of Walt Disney's chief animators. (A chief animator is in charge of one of the characters in the movie under production, and follows that "actor" throughout the entire story. Ward, for example, was responsible for Jiminy Cricket in Disney's *Pinocchio*.) Kimball has a studio where he can work at home as well as at the plant, and he also keeps a fine library of old books showing old-time railroad and street scenes. These are an invaluable reference in designing new items for the Grizzly Flats Railroad. Mrs. Kimball, alias Betty, is a very pretty young lady whose enthusiasm for the railroad project goes a long way in helping the GF to overcome its hardest difficulties.

III.

WHEN the Disney people decided to make *Dumbo*, the story of a poor circus elephant who had such big, big ears, Walt Disney recognized an opportunity to make a personality out of the engine that had to pull the big top all over the United States. He decided to name him *Casey Jr.* in good railroad tradi-

Casey Jr. is very polite to all his animal friends; he takes his headlight off and makes a nice bow for Clarabelle.

Sharp curves on the Casey Short Line. An amusing detail of the circus train is the giraffe car. Heads down, here's another tunnel!

Wow! That was a stuffy one; must have been Muffit Tunnel. The numbers are scene numbers used in making up the scripts.

tion, and, as Ward Kimball told us, "I was assigned the job of making the first rough sketches with the only lead from Walt, 'Make it like your locomotive, Ward, only cartoon it up a bit.'

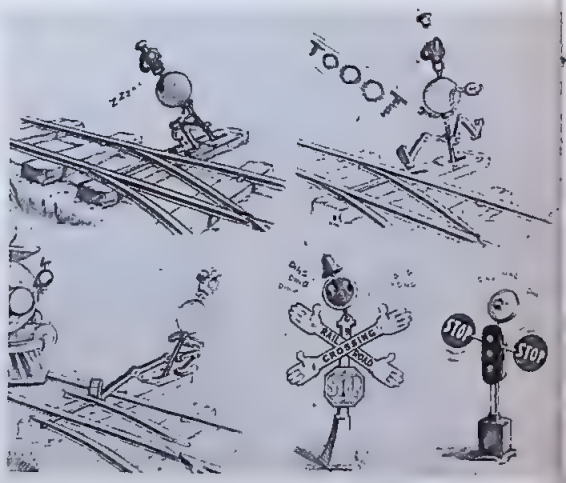
"*Casey Jr.* had to be capable of all sorts of acrobatic stunts in the active role he was to play, so he was simplified and doctored 'til he could stretch, lean in any direction, backfire, jump, bend, and do all sorts of stunts that only a fictional engine could perform. *Casey* always reflects the happiness and sadness of the circus. When things are going okay he prances down the track; when things are going wrong, he droops his eyes, hardly able to make the drivers turn."

Casey's engine house is really round; oil can and old bell hold flowers. Notice rail fence and switchstand vane on roof.

Casey's engineer looks like you-guess-who. Here he is happy; and here, he is looking for a squeak or something.

Ward turned out scads of sketches like the few on these pages; *Casey Jr.* performed all manner of caniptions, traveling a scenic line second to none.

There's the line through the "Big Trees," perhaps a take-off on the Yosemite Valley Railroad, the Northwestern Pacific or the old Mount Tamalpais & Muir Woods, but *Casey's* line is literal; it goes right through the tree trunks. *Casey* whistles plenty and shakes as he sneaks past a graveyard; after a tough mountain climb he slips his nose over the edge of a small trestle for a long drink of cool mountain water. A crisis comes when *Casey* just makes a siding in time to clear the main for the streamliner, and all the telephone poles lean 'way over in the wake of the speeding blur.



The switch is asleep at the switch—at least 'til insistent blowing of *Casey's* whistle wakes him up.

But *Casey Jr.* didn't wait for *Dumbo*; he was given a place in the movie about the Disney Studios entitled *The Reluctant Dragon* and proved to be an instant success. His face was lifted and a few final touches were added, however, before he entered his important role in "gorgeous Technicolor" in *Dumbo*.

The little elephant Dumbo, in fact, was born while riding on the circus train pulled by *Casey*. Dumbo is, of course, the real star of the full length picture, but Dumbo doesn't really find himself because his ears are so big—that is, until he accidently slips into a tub of champagne. In the after-effects he discovers his astonishing ability to use his ears as wings for flying.

But although *Casey* is an extraordinary little engine he still bears some resemblance to his prototype, *Emma Nevada*, alias *Sidney Dillon*, who clanked up and down the Nevada desert in a world that never heard of movies, or railfans, or trucks, or even of a flying elephant.

Through the Big Trees, scenic wonder of the animated world. This intriguing scene is reproduced from one of Ward Kimball's original sketches for *Dumbo*. It is followed by other sketches showing each important part of the action. Other animators then fill in the intermediate scenes by various methods, working on intricate collages of transparent plastic sheets. To extreme right, *Casey* does the old Colorado & Southern one better.

Snow is always a problem on the railroads, but this solution is a new one. Notice snow fluffs on giraffes' heads.

Casey encounters a cyclone while crossing the very flat plains of Kansas. What it does to the train is nothing compared to the twisting effect upon the track and right of way. In fact, even the letters spelling Kansas get a bit twisted after a windy toss-up.

Even semaphores have personalities. This one has indications not found in the rule books.

These are preliminary sketches of *Casey's* antics made before any actual animation.

Letters

★ Interesting sidelights on railroads as readers observe them.

Another Big Switcher.

You might know it is pretty hard to beat the Baltimore & Ohio, and I am enclosing a picture of a 10-wheel switcher which we have. In fact, we have two of them. We believe they should share the honors of "largest switcher" with the Missabe engine [page 7, November TRAINS].

You say that the Missabe engine weighs 352,252 pounds and has a tractive effort of 86,000 pounds. Our Class U locomotives, Nos. 950 and 951, have a weight on drivers of 349,500 pounds and tractive effort of 95,000 pounds. They have 30″ x 32″ cylinders and 58″ drive wheels. Steam pressure is 225 pounds.

Our locomotives were originally Santa Fe type and were converted from Class S to Class U in 1927, the engines originally having been built by Baldwin in 1914. These were the smaller Santa Fes, and I shudder to think of what might happen if we were to take the leading and trailing trucks off of one of our big S-1's and make it a 10-wheel switcher!

Larry Sagle.
Public Relations Representative, B&O.
Baltimore, Md.

B&O 10-wheel switcher.

Here is the photo sent by Larry Sagle to glean a little publicity for the B&O. No. 950 and her sister, 951, were originally 2-10-2's.

Abandoned Logging Road; More on DM&IR.

An "ABANDONED NWP" expedition took place yesterday. At Jenner, Calif., inquiry brought a tale of an ancient logging road terminating at Jenner, apparently the same line located on an 1869 map by one of the railfans present. A highway now follows on the roadbed, going north from Jenner, for about a half mile. In this stretch a piece of trestle is still standing across a comparatively small gulch. Then the road rounds a sharp point and drops into Russian Gulch. The railroad embankment swings inland, high on the side of the gulch, and heads for a small canyon.

We drove up a side road (the old highway) and climbed through assorted bushes, trees, etc., to what we thought to be the railroad right of way. As we followed it up the rapidly narrowing canyon we began to have doubts. It undulated too much, and the curves were pretty sharp. Perhaps we were too far down the hillside, although the level seemed correct. Then we entered heavily wooded slopes, and a few semi-trestle-like structures were found on sharp curves, but no spikes nor ties. It could have been a glorified skid road; many such are graded almost like a railroad. But why the definite trestle near Jenner?

We poked on, hunting around on a huge slide for a while before picking up the scent on the other side. A hundred yards farther on, to one side of the dry creek bed, was a long cribwork of ancient and mossy logs—rotted, bending, but still forming what might have been a trestle along the side of the creek.

Then some carefully hewn timber, thoroughly aged, was discovered beyond. On and on the party went, clambering over log jams formed by trestlework which had been washed away from the side of the creek. Some

of this construction was still intact, but looked like a skid road.

Still not a spike. But what was this? A trestle of some kind over a side creek, then an absolutely straight cut, three to eight feet deep, through a slight projection in the hillside. The cut was some hundred feet long, and immediately following it was a well-constructed trestle over a low dip. It looked normal for a one-horse railroad, and, if built in 1869, one can't expect too much. But no ties. However, on the two longitudinal stringers were moss-covered beams, about 4" x 4".

We continued some more, but found no other evidence different from that which we had already observed. It was getting late; we back-tracked, and found along the way something we had previously missed: a 10-foot length of strap iron, about 1½" wide, with holes drilled in it every foot.

The only thing we could decipher from all of this was that a wooden-and-strap-iron railroad once ran the entire distance from the mill at Jenner to wherever the terminus was, up the creek; in its later history, the lower end of the line was made into a skid or wagon road, while the upper portion was left untouched. The gauge was very close to standard, according to the measurements taken.

The Duluth, Missabe & Iron Range article [November TRAINS] is most interesting. I passed through that country in the Summer of 1940 and noticed the large number of tracks leading in all directions, seemingly to no place in particular. After staying over night at Ishpeming I snapped the enclosed pictures. The vertical-boiler engine has a sign on it reading:

THE YANKEE
FIRST AMERICAN HAULAGE LOCOMOTIVE
BUILT FOR MINING OPERATIONS
USED AT JACKSON MINE
1868 TO 1893

A few feet away was the track upon which the ore train came chuffing up. (This was at the east end of town.) I don't know the reason for the empty car in front.

Jim Morley.

2635 Etna St., Berkeley, Calif.

Honeymoon on a Railroad.

THE November issue of TRAINS carried a paragraph about the road I like best of all: the Bridgton & Harrison. I spent quite a while last Summer working on the B&H during my honeymoon. My official capacity was never determined, but I was the engineer on many trips and my bride the conductor.

You stated that on September 12 the last train ran between Bridgton and Harrison. Maybe you meant September 12 of another year, but I doubt it. The Harrison branch was ripped up sometime back in 1930, and trains have since been running only between Bridgton and Bridgton Junction.

F. Van Wormer Walsh Jr.

1703 Well Dr., Fairlawn, N. J.

Neither Can We.

I WAS pleased to note, on page 3 of your October issue, an opinion on the St. Lawrence Waterway. So far this is the first United States opinion I have seen that is derogatory to the scheme. The majority of the people in Canada, apart from politicians, are also opposed to it for the simple reason that we cannot afford it.

J. R. MacLeod.

Quebec, Canada.

Ore train; museum piece.
Left: Lake Superior & Ishpeming ore train at Ishpeming, Mich., powered by Consolidation No. 27. Right: *The Yankee.* See letter from Jim Morley.

Books

★ New photos, old lithos, histories of roads big and little.

TRAINS IN TRANSITION, by Lucius Beebe. 210 pages, 8″ x 11″. $5. Published by D. Appleton-Century Company, New York.

AGAIN Lucius Beebe scores with a railroad picture book, 176 photographs superbly chosen and captioned. The text is not as lushly romantic as in the first Beebe book, *High Iron*, but it follows a well-worked-out subject, the change in railroading wrought by the last quarter century or so. Attention is given to the trains of today, the fast freights and luxurious passenger trains which are doing a real transportation job in a way not even imagined as little as 10 years ago.

For the railroad amateur the Beebe books, *High Iron, Highliners,* and *Trains in Transition,* give an over all perspective of the American railroad scene which is hard to obtain otherwise. They are an *Official Guide* with illustrations and running commentary, a cosmopolitan selection of scenes, railroads, and types of equipment from all sections of the country. None of the three is either technical or coldly historical. They are written and illustrated for the man who likes trains.

IRON HORSES, by E. P. Alexander. 239 pages, 8″ x 11″. $5. Published by W. W. Norton & Company, New York.

THROUGH the years from 1829 to 1900 the American locomotive developed its personality. Year by year new machines appeared with changes of external design, the changes which made the essence of the locomotive we know so well today. On the thesis that our present motive power can best be understood by a background of this nineteenth century locomotive history, Mr. Alexander has produced *Iron Horses* from apparently inexhaustible collections of early prints and a wide knowledge of the subject.

Each old engine in itself may lack in interest to the connoisseur of modern power, but taken in order the old-timers tell a story. The job is well done by Mr. Alexander.

Men who like early locomotives anyway need only be told that the book contains 96 full-page plates, most of them reproduced from old builders' advertising lithographs or from the finely detailed pen and ink sketches which became prevalent in later years. A useful appendix is a list of all principal American locomotive builders, with the years during which they were in business.

THE RAILROAD INDUSTRY, by Bernard E. Young. 20 pages, 6″ x 9″. 75 cents. Bellman Publishing Company, Boston.

ONE of series of monographs on vocational and professional opportunities, this booklet treats the railroad business as a choice for a life's work. The organization of a typical railroad is discussed, together with the workers in various classifications and their average compensation. Further sections develop the personal and educational qualifications for various kinds of railroad work, the employment possibilities, the advantages and disadvantages, opportunities for women, schools, and books and magazines carrying information on railroads. A young person considering whether to make railroading his life work can do no better than to read this concise, pointed work. Mr. Young, manager of the Railroad Section, A. A. R. Public Relations Department, has been in railroad service since 12 years of age and knows his subject well.

BURLINGTON WEST, by Richard C. Overton. 538 pages, 6″ x 9″. $4.50. Published by the Harvard University Press, Cambridge, Mass.

THE detailed history of any large railroad system is certain to be a well received document, and this book on the Chicago, Burlington & Quincy is no exception. But it is more than the history of a railroad. It is a story of the social development of the West resulting from colonization promoted by railroads on their land grants.

We now are all to prone to think of the land grants as out-and-out subsidies. Perhaps we do not realize how empty were the Western lands in those years after the Civil War. The railroads were given land, true, but it was worthless without the railroads, and even with railroads there was no easy market for the land, and, worse, no traffic for the new railroads. To promote traffic as much as to sell the land it was necesary to secure settlers.

Railroad land agents worked not only in the

more settled East but in Europe, publicizing the Western prairies and the freedoms of the United States. The result was the great tide of immigration. Only through the quoting of contemporary correspondence in a book such as this can we realize how much emphasis was laid upon sales to the right kinds of people, hardworking settlers who would really develop the lands and furnish future business and agricultural growth.

BONANZA RAILROADS, by Gilbert H. Kneiss. 139 pages, 7" x 10". $3. Published by Stanford University, Calif.

EDWARD HUNGERFORD says, "For Gilbert Kneiss to write of the little railroads of California and Nevada is a little more natural and easy than falling off the proverbial log. He is steeped in their lore. A passion for fine detail, a skill for writing, and an ability to put transport things together well, makes any volume from his pen well worth the reading." And past master Hungerford should know, for Kneiss was technical director of Hungerford's pageant, *Railroads on Parade*, at the New York World's Fair.

All of which is a pretty good recommendation for the book even before we start, and we find that Hungerford understated if anything. *Bonanza Railroads* preserves the stories of five little railroads of the golden West, five little railroads that once had great ambitions. All were ranged along the old Central Pacific: the Eureka & Palisade, the Nevada Central, the Virginia & Truckee, the Sacramento Valley, and the San Francisco & San Jose.

All the inescapable glamour of old-time railroading is in the book, with the necessary historical data sandwiched smoothly between incidents. You'll chuckle at the way John Sexton, the individualist who ran the Eureka Nevada in its last days, forced the government to send him an overdue railway mail check. And at the dry humor of the author as he tells how William Lewis made the first survey for the projected San Francisco & San Jose on horseback and turned in an estimate correct right down to 17 cents! Here is an author who not only knows that railroading is a very human enterprise, but also has at his finger tips the information for the background stories and the ability to tell them well.

AMERICA IS YOURS

See the United States spread out before you

HE WHO TRAVELS FAR IN HIS MIND WHEN YOUNG WILL GO FAR BEFORE HE IS OLD.

The crude charts of the early map makers lured COLUMBUS, MARCO POLO and MAGELLAN to the ends of the earth.

Think what the masterpiece of mapmaking, "Ohman's New Relief Map of the United States," can do for you! Whether you live in a large city or pleasant countryside you can travel with ease, charted by Ohman's map of "Our Country."

In your mind's eye the greatest skyscrapers of Manhattan raise their bewildering heights; great laboratories disclose momentous scientific discoveries; industry's wheels whirl from coast to coast. Vast fields of waving grain, snow-white cotton, brown tobacco, beckon you along the nation's railways. Majestic peaks, sparkling streams and blue lakes invoke admiration and inspiration.

Railroads

All important railroad routes are easily followed on this map, and the three-dimensional relief makes it easy to see what determined the routing, how mountains are crossed and river valleys followed.

It's almost as much fun to visualize these trips with an Ohman map as it is to actually take them.

Map is 36" x 23," scale 1" to 85 miles. Key to the map is on reverse side, and each copy is complete with metal strips ready for hanging. Postpaid $3.50

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Makers of Fine Maps

MEMPHIS TENNESSEE

The Month

★ Transcontinental short-cut suffers setback due to war.

★ The Santa Fe has been granted permission by the I. C. C. to postpone until 1944 the completion of a line from Farley to Colmor, N. Mex., which will shorten its Chicago to Los Angeles distance by 67 miles. While there is no official comment on the use to which this shortcut would be put, its shortness and the apparently easy grades, avoiding tough Raton Pass, make it likely to become an important alternative main line. The connection leaves the present main line at Dodge City, Kan., and the new construction would rejoin the present line just a short distance south of Raton.

★ One of the railfans' favorites, the Arcade & Attica, 28-mile short line connecting the Pennsylvania with the Erie and the New York Central some miles east of Buffalo, has gone modern. A 44-ton, 380-horsepower General Electric baby Diesel is now pulling the A&A's two mixed trains.

★ Many a branch line abandonment has been spurred by war conditions, the need for all available equipment and the high price of scrap. At the same time war traffic has granted many a proposed abandonment a temporary reprieve, and miles of new railroad is being laid to temporary camps, powder plants, and other war industry—track which will perhaps cause an upswing of abandonments in years to come.

★ New locomotives bring their own headaches. The Union Pacific's huge 4-8-8-4's have necessitated the installation of a new 140-foot turntable at Green River, Wyo. This is the world's longest turntable.

★ One hundred additional passenger coaches are being modernized by the Pennsylvania. This will make a total of 643 completely modern passenger cars on the Pennsy, and 498 older cars which are air-conditioned. In addition, 1021 air-conditioned Pullmans assigned to the Pennsy bring the total to 2162 air-conditioned cars to handle next Summer's traffic on this one railroad.

★ Of particular significance as our country enters upon a serious war is the importance other countries attach to railroads as a reliable and necessary means of military transport. We have heard much, for instance, about the Burma Road, but do we also know that the very fact that it is a road is recognized as a bottleneck, and that a railroad is under construction to parallel it and relieve the bottleneck? Equally revealing is Germany's Trans-Sahara Railroad to Dakar. The school of thought which looks upon highways as a cure-all method of transport will find it hard to explain why the very efficient German military planners decided upon rails as a means of transport to a strategic spot.

★ Norfolk & Western now has in service what are probably the longest standard passenger cars in the country: 15 new streamlined, 85-foot cars which have been placed in service on the *Pocahontas* and the *Cavalier* between Norfolk and Cincinnati. The road has also placed in service the first of its new streamlined 4-8-4 passenger locomotives.

★ *Railroadin'*, a movie showing what the railroads have meant in the growth and development of the United States and what the railroads are doing today to move products and people in larger quantities and numbers than ever before, has been produced by General Electric and American Locomotive Company. It is a 30-minute picture in full color and sound and is now available for showing by clubs.

★ The Union Pacific has asked I. C. C. permission to abandon the entire 111-mile line of its subsidiary, the Laramie, North Park & Western.

★ Locomotive gossip: The Pennsylvania, after successful tests of the Franklin system of steam distribution, is planning to equip 15 of its type K-4 passenger locomotives with poppet valves and boosters. The Illinois Central is converting some of its older Mikados to 0-8-2 yard and hump engines.

★ Statistical comparisons between railroad revenues and expenses in 1921 and those in 1940 produce some interesting facts. Twenty per cent more ton-miles of freight service was delivered to customers for 12½ per cent less in 1940 than in 1921. While gross earnings of the railroads declined 22 per cent, taxes went up 45 per cent in 20 years.

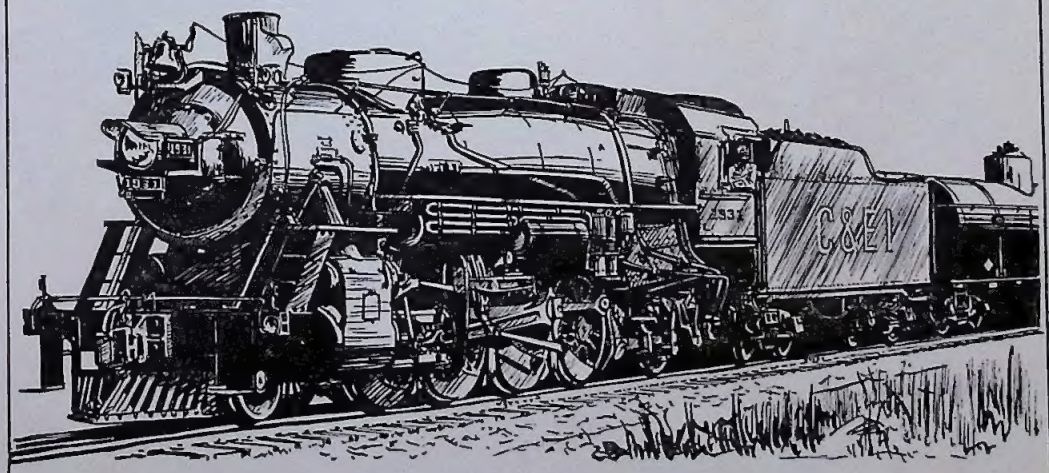
★ An indication of the extent to which railroad fans use railroad travel was given by registration figures of the National Model Railroad Association convention recently held in Peoria, Ill. Analysis showed that of 360 registered 85 per cent came by rail. Most of the remaining 15 per cent lived too close to make rail travel practicable.

The frisky Frisco.

Let no one say the Frisco is backward in an advertising way. This up-and-coming road mailed out a piece of literature timed to arrive on Friday the 13th and with a lucky horseshoe attached. And its 12-page gravure vacation folder was printed with pine-scented ink to remind the prospective traveler of woods and forests.

C&EI Mike

"Workhorses of the nation" might be apt titles for these venerable U S R A Mikados, built during World War I The Chicago & Eastern Illinois Railroad has 15 of these engines, built by American in 1918 and numbered 1925 to 1939. Characteristic of the C&EI's stud of locomotives are the big initials of the road on the tank sides and the larger-than-average headlights The 2-8-2 is a good all-around locomotive for freight service on a road such as the C&EI, for these engines are as equally at home with 60 cars as with a light haul of 20 or 30 cars. The 1931 is a well designed locomotive, both in appearance and in weight distribution. Weight on the front truck is 20,000 pounds; the drivers carry 220,000 pounds, and the trailing truck supports 51,900 pounds of fire box, frame and cab, not including the weight of the engine crew nor their lunch boxes.



Total weight of No. 1931, road classification N-2, is 477,400 pounds with tender. Grate area, 66.7 square feet. Boiler pressure, 200 pounds. Drivers, 63". Tractive force, 54,700 pounds. Cylinders, 26" x 30".

GIL REID

Trains

See page 9.

Courtesy Gulf Oil Company.

Dear sir,

Per one of our editors: "The January 1942 issue, with the PRR S1 painting on the cover, indeed does have a printing error on the Contents page, which incorrectly identifies the issue as January 1941. This is the subject of a letter on page 48 of the following (Feb. '42) issue."

Thank you for your inquiry!

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